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AMBIENT TEMPERATURE AND VEHICLE EMISSIONS

B. H. Eccleston, et al

Bureau of Mines

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16. ABSTRACT

A test program was conducted to study the effects of ambient conditions on exhaust emissions from a variety of automobiles. Twenty-six cars, ranging from 1967 models through catalytic converter-equipped prototypes and cars powered by unconventional engines (rotary, Diesel, and stratified charge), were tested at 20°, 50°, 75° and 110°F.

Test procedure was the 1975 FTP, but with engine hoods closed and cooling air flow keyed to vehicle speed. HC, CO, NOx, total aldehydes, and reactive hydrocarbons, plus carbon balance fuel economy, were measured.

From production cars and catalyst-equipped cars, '75 FTP composite emissions of all three gaseous pollutants were highest at 20°F. HC and CO were generally lowest at 75°F; composite values were greatly influenced by cold start (Bag 1) emissions. Composite NOx emissions were generally lowest at 110°F, and were relatively unaffected by ambient temperature. Fuel economy at 20°F was about 10% lower than at 110°F.

The Diesel and stratified charge cars had low emissions and little temperature sensitivity. Use of air conditioners at 110°F caused higher emissions and about 10% lower fuel economy. Reactivity of HC emissions and aldhyde emissions were unaffected by temperature and were lower from catalyst-equipped cars at all temperatures.

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FOREWORD

This report presents a summary of work performed by the Fuels Combustion Research Group, Bartlesville Energy Research Center, Bartlesville, Okla., for the Environmental Protection Agency (EPA), Office of Air and Waste Management, Office of Mobile Source Air Pollution Control, Emission Control Technology Division under Interagency agreement numbers OMSAPC-IAG-007, OMSAPC-IAG-D4-F402, and OMSAPC-IAG-D4-F533.

Mr. H. Anthony Ashby, Emission Control Technology Division, EPA, was the Project Officer. The program at Bartlesville was directed by R. W. Hurn, Research Supervisor; with B. H. Eccleston, Project Leader, responsible for the experimental work.

SUMMARY

The effect of ambient temperature on exhaust emissions has been studied experimentally using a variety of automobiles tested at artificially-controlled ambients of 20°, 50°, 75°, and 110° F.

Twenty-six cars, ranging from 1967 models through catalytic converter-equipped prototypes of 1975 models and cars powered by unconventional engines, were tested for exhaust emissions by the standard Federal procedure. Of the twenty-six cars, there were nineteen production cars powered by conventional engines, four catalyst-equipped prototypes, one production car with a rotary engine, one stratified charge engine, and one diesel.

This is a report of the data that were obtained for emissions of hydrocarbon (HC), carbon monoxide (CO), and oxides of nitrogen (NO_x) for all the vehicles at each test temperature. Additional data were taken to determine total aldehyde (RCHO) and reactive hydrocarbon. Data pertinent to operating temperatures that might have significance in interpretation of the test results were taken during the tests and are reported.

All tests were conducted using a chassis dynamometer in an environment in which temperature and humidity were controlled. Emissions measurements were made using the 1975 Federal Test Procedure except with some modification to the vehicle cooling procedure to more nearly approach actual vehicle in-use conditions. The possible effect of this procedural variation on findings was studied and judged to be negligible.

It was found that the highest emissions of the three gaseous pollutants occurred at 20° F. Unburned hydrocarbon (HC) and carbon monoxide (CO) emissions were generally lowest at 75° F. Hydrocarbon and CO emissions were the most sensitive to temperature. Hydrocarbon emissions at 20° F were about 1.5 to 2.7 times as high as those at 75° F. Carbon monoxide at 20° was about 1.2 to 5 times as high as at 75° F. Oxides of nitrogen at 20° was only 1.2 to 1.4 times as high as at 75° F.

Analysis of the data has indicated that HC and CO emissions from the cold start phase of the Federal test were the most sensitive to ambient temperature. This is especially true of the catalyst-equipped cars which showed excellent control of HC and CO across the entire temperature range once the engines and catalytic converters achieved operating temperature. With NO_x emissions the ambient temperature sensitivity was fairly constant throughout the three phases of the Federal test.

When HC and CO emissions from the catalyst cars were compared with those from the 1969-70 models, reductions of about 90% were seen at the 75° F ambient temperature (the 1970 Clean Air Act mandated 90% reductions in HC and CO). For HC emissions that degree of reduction was maintained fairly well across the temperature range-- 83% reduction at 20° F, 90% reduction at 110° F. The reductions in CO emissions also remained high at high temperature (87% at 110° F) but dropped to only 62% at 20° F.

The decline of CO control effectiveness is due to normal choke operation rather than so-called "defeat devices". EPA recognizes the need for fuel-air mixture enrichment at low temperatures not only for easier starting and safe driving, but also for emission control. Rough running and misfires will cause high exhaust emissions.

A diesel-powered car and a developmental stratified charge engine-powered car both exhibited low emissions with very little change due to ambient temperature.

Tests made with and without air conditioners operated at 110° F test ambient showed that the additional load imposed by air conditioners resulted in increased exhaust emissions in parallel with penalty to fuel economy. Both effects were substantial.

INTRODUCTION

That ambient temperature does affect the character and quantity of emissions from automobiles has been known for some years (1-4).* However, as a matter of practical uniformity, the Federal Test Procedure (5) provides that emissions measurements be made with the vehicle operated in an environment of temperature with the limits of 68° F to 86° F. This temperature range was chosen as representative of temperatures typically encountered in areas beset by photochemical smog problems and probably represents an initial primary concern with photochemical effect. However, other pollutants to which the automobile contributes are now a matter of concern in a number of urban areas that represent widely varied ambient conditions. Representative of such widely divergent ambients are Phoenix, Arizona, and Fairbanks, Alaska. Because of the possible consequence of the wide variation encountered in operating vehicles within the U.S., it was desirable and was encumbent upon the cognizant regulatory agency that additional information on the effect of ambient temperature on emissions be obtained and made generally available.

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* Underlined numbers in parentheses refer to the list of references at the end of this report.

Special note should be taken of the fact that in and of itself the experimental program reported herein was not designed to yield all information needed for a statistically valid expression of effects that would be expected from all or any given segment of the auto population. Instead, the study was made to characterize the more prominent trends in an association of ambient temperature and emission levels and to determine the nature and degree of difference in sensitivity to temperature observed for vehicles representing varied age groups and representing differing control technologies.

TEST PROGRAM

All tests were conducted in the controlled ambient chassis dynamometer facility, Figure 1, located at the U.S. Bureau of Mines, Bartlesville, Okla., Energy Research Center. Temperature and humidity conditions were selected to represent within the capabilities of the test facility seasonal variations that occur across the more populous areas of the nation. The ambient conditions were:

20° F, 5 to 10 grains water per pound dry air
50° F, 20 to 30 gr/lb
75° F, 50 to 70 gr/lb
110° F, 45 to 65 gr/lb

In addition to the basic program involving the above four temperatures and twenty-six test cars, three late-model (1974) production cars were tested at 60°, 70°, 80°, and 90° F to define more closely the temperature of zero slope (maxima or minima) in curves relating temperatures and emissions.

TEST PROCEDURES

The 1975 Federal Test Procedure (FTP) for sampling and measurement of HC, CO, and NO_x used in these studies is described in the Federal Register (5). The test involves soaking the vehicles for 12 hours at the test ambient (between 68° to 86° F for the FTP and at the designated ambient for this study). The vehicle is then started and run through a 23-minute, 7.5 mile simulated urban driving cycle while its exhaust is sampled in two segments of the test. The first segment, known as the cold transient phase (bag 1), involves the initial 505 seconds of the 23-minute cycle including the cold start portion of the test. The second segment, referred to as the stabilized phase (bag 2), includes that portion of the test beginning after 505 seconds and continued to the end of the 23-minute test. At this point the engine is turned off and allowed to stand for 10 minutes. It is then restarted and the first 505 seconds of the cycle is repeated to provide the third segment or hot transient phase (bag 3).

The emissions measurement by this procedure, designated 1975 composite, is expressed in grams per mile. It is calculated by weighting the cold transient mass emissions by 43 pct, the hot transient by 57 pct, combining these with the stabilized phase emissions, and dividing by the 7.5 mile trip length. This is equivalent to assuming that on an average 43 pct of the vehicle's urban trips are made from a cold start, 57 pct from a hot start, and the additional assumption that the mass emissions during the stabilized phase are unaffected by the engine status, i.e., hot or cold at start. The above weighting procedure was established to reflect the nature of metropolitan auto operation in which a large fraction of engine starts within a given day are made after an initial day's run and before the engine and related temperatures return to near equilibrium with the ambient.

The tests conducted in this program differed from the Federal Test Procedure in that (1) evaporative emissions were not collected, (2) an additional 10 pct load increment required of cars equipped with air conditioning was not used, (3) the hood remained closed during the test, and (4) windage was generated across the vehicle and was modulated to follow (i.e., equal) vehicle speed.

VALIDATION OF PROCEDURE

The hood-down procedure was used because the original concept of the temperature effects program was to duplicate as closely as possible typical vehicle user practice at varied ambient conditions and to determine emissions as they would be generated under those conditions. Under this concept it was desirable that emissions be measured with the vehicle operated in its normal configuration and with windage applied over the vehicle to duplicate road air stream velocity. The FTP specifies that auxiliary engine cooling be provided with the hood open and cooling air supplied by a fixed speed fan of 5,300 cfm maximum capacity placed 8 to 12 inches in front of the radiator grill. Because the Federal Test Procedure differed from the one proposed for use in the study, it was necessary to determine the correspondence between emissions measurements made using the procedures of this study and measurements made following the standard Federal procedure. No significant differences due to hood/windage configuration could be found for either the three production vehicles or the two low emission vehicles. Therefore, a test procedure with the hood down and windage keyed to the roll speed was accepted as more representative of conditions for vehicles in normal use. Detailed information for results of these tests is given in the tabulations of Appendix A.

EQUIPMENT

Vehicles for the test were designated by the Environmental Protection Agency for procurement by the Bureau of Mines subject to availability within reasonable efforts. The criteria for selection were:

--The fleet of older cars (1967 through 1972 model years) should reflect the nationwide mix as well as possible in a 15-car fleet, the limited number being dictated by budget constraints.

--Among the newer production cars (1973 and 1974) a five-car fleet should encompass the more prominent size range of engines and the more commonly used emission control approaches including emission control modulation. One fuel-injection engine was to be included among the five.

--Six development cars were chosen to include engines and emission control features in near-prototype status and believed to approach closely the design and performance characteristics of models to be introduced 1975 and later.

--Three 1974 cars were used in experiments to better define emissions sensitivity to temperature in the range of 60 to 90° F.

Twenty-nine cars (Table 1) were used in the study. All standard production vehicles were low mileage cars considering their respective age categories. Four vehicles were equipped with engines that incorporated advanced or prototype emission control systems, including oxidizing catalytic converters. These four and the standard production diesel car (not sold in the United States) were provided by the Environmental Protection Agency through the couresy of the auto manufacturers. The stratified-charge car was owned by the Environmental Protection Agency, having been built under a stratified-charge evaluation program.

VEHICLE INSPECTION AND TUNE-UP

For the vehicles obtained from dealers' lots, the following items were examined for proper condition; repairs or replacements were made as necessary:

- Spark plugs
- Breaker points
- Advance and dwell settings
- Idle speed and mixture
- Automatic choke function
- Heat riser valve
- Carburetor air heater
- Air filter
- PCV valve
- Fuel evaporation control system

Most of the higher mileage vehicles needed some maintenance prior to use in the study. Typical requirements were for spark plug and air filter replacement and for repairs to the exhaust system. Timing and idle speed were the adjustments most commonly required. Idle mixture was not adjusted unless the adjusting screw caps had been removed or altered. Routinely, the automatic choke system and throttle plates were cleaned with gum solvent. No internal carburetor adjustments were made.

Spark plugs were replaced and idle speed and timing were changed as necessary for the 1973-74 vehicles that were obtained directly from dealers. Otherwise, minimum corrective adjustment was done. The Mazda

Table 1. VEHICLE TEST FLEET

Car No.	Year	Make & Model	Engine Size	Trans.	Air Cond.	Emission Control	Inertia Weight
49	1967	Ford Galaxie	289	A3		PCV only	4000
53	1967	Chevrolet Impala	283	A2			4000
59	1967	Plymouth Fury	318	A3			4500
57	1969	Chevrolet Malibu	307	A2	Yes	EM added	3500
54	1969	Ford Galaxie	302	A3			4000
58	1969	AMC Ambassador	290	A3			4000
62	1969	Mercury Monterey	390	A3	Yes		4500
60	1970	Oldsmobile Cutlass	350	A3	Yes		4000
55	1970	Chrysler Newport	383	A3	Yes		4500
50	1971	Ford Galaxie	351	A3		EEC added	4500
51	1971	Chevrolet Impala	350	A3	Yes		4500
52	1971	Chevrolet Impala	400	A3	Yes		4500
63	1971	Dodge Coronet	318	A3	Yes		4500
61	1971	Buick Electra	455	A3	Yes		5000
39*	1972	Ford Torino -C	351	A3	Yes		4000
38	1973	Mazda RX2 (Rotary)	34.9x2	M4	Yes	TR	3000
40	1973	Volvo 142	121	M4	Yes	EGR, EFI	3000
42*	1973	Chevrolet Laguna	350	A3	Yes	EGR	4000
41*	1973	Ford LTD	351	A3	Yes	EGR	4500
45	1974	Ford Torino -C	351	A3	Yes	EGR, MAI	4500
56	Prototype	Ford Pinto	140	A3	Yes	Ox. Cat. added	3000
48	Prototype	Plymouth Satellite	318	A3	Yes		4000
43*	Prototype	Ford LTD	400	A3	Yes		4500
46*	Prototype	Chevrolet Belair	350	A3	Yes		4500
44	1973	Opel Rekord Diesel	126	A3		None	3000
47	Prototype	Ford PROCO Capri	141	M4		Strat.chg., EGR, Ox.cat.	2500
69**	1974	Plymouth Fury III	360	A3	Yes	EGR	4500
70**	1974	Chevrolet Chevelle	350	A3	Yes	EGR, MAI	4000
71**	1974	Ford Torino	351-W	A3	Yes	EGR	4500

Transmission Code

A2 - automatic 2-speed
A3 - automatic 3-speed
M4 - manual 4-speed

*Used in hood configuration/windage study
**Used in 60°, 70°, 80°, 90° F study

Emission Control Code

PCV - positive crankcase ventilation
EM - engine modifications
EEC - evaporative emission control
EGR - exhaust gas recirculation
MAI - manifold air injection
EFI - electronic fuel injection
Ox.Cat. - oxidizing catalytic converter
TR - thermal reactor

(car 38) was returned to the dealer for idle adjustment as the idle mixture appeared to be much too rich. No adjustments were made to the vehicles supplied by the Environmental Protection Agency.

Before tests were made, all vehicles were fitted with thermocouples to measure the temperatures of coolant, oil, and air to the carburetor.

AMBIENT TEMPERATURE AND HUMIDITY

All measurements were made with vehicles operated on a chassis dynamometer equipped for both temperature and humidity control. Figure 1 is a schematic of the dynamometer cell. The temperature of the test cell was controlled as required in the range of 20° to 110° F with windage across the vehicle at test cell temperature. The temperature of the air to the vehicle was measured at a point three feet ahead of the vehicle. Related temperature measurements were made for air-to-carburetor, coolant, and oil. These measurements were made at each of ten equally spaced time intervals during each test. Results are tabulated in Appendix E.

The degree of temperature control that was attained is indicated by data from the group of 1969-70 vehicles (Table 2).

Table 2. VARIATION IN CHASSIS DYNAMOMETER CONTROLLED AMBIENT Temperature During the 42-Minute Test Period

	Nominal test ambient			
	20° F	50° F	75° F	110° F
Average	21.7	50.8	75.0	109.8
Standard deviation	2.8	1.5	1.4	1.6
Range	16-26	47-54	72-78	105-112

It is estimated that the average temperature over the full test typically was within ± 1° F of the nominal temperature for all except the 20° F ambient and was within ± 2° F for the 20° F ambient.

Humidity control was somewhat less precise than intended probably because of wide outside atmospheric variations and limited response capability of the humidity control system. The data of Table 3 illustrate the variations typical of the test program.

Table 3. CHARACTERISTIC CHASSIS DYNAMOMETER HUMIDITY CONTROL
Ambient Moisture Content, Grains Water per Pound of
Dry Air, Average During the 42-Minute Test Period

	Nominal test temperature			
	20° F	50° F	75° F	110° F
Average	9	26	64	61
Standard deviation	1	2	6	9
Range	8-11	22-30	52-76	49-87
NO_x-K_h for range shown	0.76-0.79	0.80-0.83	0.90-1.01	0.89-1.06

The humidity correction factor (NO_x - K_h) given above for the minimum range in moisture content observed at each temperature is calculated according to the Federal procedure (5).

AIR CONDITIONER OPERATION

The cars were tested with air conditioners off for all tests except as specifically shown otherwise. To assess the effect on emissions of operating the vehicle air conditioner, 17 cars were tested at 110° F with their air conditioners in operation with cooling air to the passenger compartment set at maximum delivery.

TEST FUELS

Lead-free 9.5 pound RVP fuel and a leaded 8.7 pound RVP fuel were used as summer grade fuels for the 75° and 110° F test ambients. Lead-free 12.2 pound RVP fuel and a 10.7 pound RVP leaded fuel were used at 20° and 50° F. The lead-free fuels were used in the catalyst-equipped vehicles; properties of the fuels are listed in Table 4.

Indolene fuel of 12 pound RVP and 91 RON was used for the tests conducted at 60°, 70°, 80°, and 90° F. A 44 cetane index diesel fuel with a 386° F 10 pct point and 568° F 90 pct point was used in the one diesel-powered vehicle (car 44).

EMISSIONS MEASUREMENT

Hydrocarbon was measured by flame ionization, carbon monoxide by non-dispersive infrared and oxides of nitrogen by chemiluminescence. All sampling and measurement procedures were as specified in the latest Federal Test Procedure. Exhaust samples of twelve vehicles were measured for total aldehydes using continuous absorption sampling followed by an MBTH procedure (6).

Table 4. FUEL INSPECTION DATA

	Lead-Free Fuel		Leaded Fuel	
	Summer	Winter	Summer	Winter
Distillation, °F:				
Initial	92	88	105	93
10 pct distilled	124	110	130	122
20 pct distilled	148	133	150	146
30 pct distilled	174	162	171	172
40 pct distilled	202	195	192	196
50 pct distilled	222	219	212	218
60 pct distilled	238	232	232	239
70 pct distilled	254	250	258	265
80 pct distilled	275	274	294	302
90 pct distilled	311	316	340	338
End point	376	373	408	397
Loss, pct	1.5	2.5	1.0	3.5
Reid vapor pressure	9.5	12.2	8.7	10.7
Density, lb/gal	6.148	6.082	6.202	6.099
Specific gravity	0.7380	0.7300	0.7444	0.7321
Gravity, ° API	60.2	62.3	58.6	61.8
FIA, volume pct:				
Aromatics	25	25	29	24
Olefins	9	9	5	6
Sulfur	0.01	0.01	0.02	0.02
TEL, ml/gal			1.08	0.50

ANALYSIS FOR HYDROCARBON COMPOSITION

Composition of the hydrocarbon component (7) of emissions was determined for the exhausts of each of twelve vehicles sampled for each phase of the CVS 1975 procedure. From these compositional data, non-methane hydrocarbon and a "reactive" hydrocarbon mass were calculated. In this classification, "reactive" hydrocarbon is defined as the total hydrocarbon (by FID) less methane, ethane, propane, acetylene, and benzene.

RESULTS

To establish a logical basis for consolidation of the data according to similitude in vehicle age and control technology, units of the test fleet were grouped and results averaged according to the following:

--Three 1967 models (production cars with positive crankcase ventilation--the only emissions control).

--Six 1969 and 1970 models (production cars to which early emission standards for HC and CO applied).

--Six 1971 and 1972 models (1971 was the first year for Federal evaporative emission control standards).

--Four 1973 and 1974 models (1973 was the first year for the Federal NO_x standard).

--Four developmental cars with conventional engines and oxidizing catalytic converters (possible prototypes of 1975 production cars).

--Three development units considered separately because of unconventional engine types--rotary, diesel, and PROCO stratified charge, respectively.

Summarized emissions data for vehicles grouped as above are listed in Tables 5-7.

INFLUENCE OF TEMPERATURE ON HC, CO and NO_x

Vehicles in all categories except the diesel and stratified charge showed a common characteristic of CO and HC emissions sharply increased at low ambient temperature (Figures 2 and 3). Oxides of nitrogen change with variation in ambient temperature was less pronounced (Figure 4), but the general trend was for NO_x also increased at the low ambients.

The explanation for marked increase of HC and CO emissions at low ambient may be deduced from the data from the individual phases of the tests. From these data, summarized and illustrated for CO (Figure 5), it is readily deduced that the effect of greatest magnitude (in moving from a "normal" ambient within the 70° to 80° F range) is upon the cold start emissions. A similar effect is noted for hydrocarbon. The explanation is unquestionably related to (1) carburetion of rich mixture during the choking phases of starting and warmup and (2) lack of activity

Table 5. HYDROCARBON EMISSIONS AVERAGED FOR VEHICLE GROUPS

	HC emissions, g/mile			
Test ambient....	20° F	50° F	75° F	110° F
Vehicles	WEIGHTED COMPOSITE			
3 1967	12.84	10.61	8.51	7.90
6 1969 - 1970	7.64	5.40	4.80	4.94
6 1971 - 1972	5.77	4.81	3.89	3.79
4 1973 - 1974	5.90	-	3.18	3.64
4 Prototype, 75	1.31	.81	.49	.50
1 Rotary	6.19	-	2.87	2.74
1 Diesel	.60	.30	.49	.40
1 PROCO	.55	.28	.20	.14
	COLD TRANSIENT PHASE			
3 1967	31.6	23.2	13.3	9.0
6 1969 - 1970	18.5	9.66	6.48	5.03
6 1971 - 1972	14.4	9.97	4.80	3.60
4 1973 - 1974	15.9	-	4.42	3.57
4 Prototype,75	5.20	2.64	1.30	1.01
1 Rotary	23.1	-	4.71	3.59
1 Diesel	1.81	.61	.64	.53
1 PROCO	2.17	.95	.58	.42
	STABILIZED PHASE			
3 1967	8.59	7.75	7.61	7.83
6 1969 - 1970	5.16	4.45	4.51	4.90
6 1971 - 1972	3.70	3.63	3.69	3.60
4 1973 - 1974	3.17	-	2.90	3.38
4 Prototype , 75	.28	.24	.19	.23
1 Rotary	1.05	-	1.56	1.33
1 Diesel	.23	.23	.51	.20
1 PROCO	.10	.08	.10	.05
	HOT TRANSIENT PHASE			
3 1967	6.83	6.58	6.63	7.19
6 1969 - 1970	4.19	4.00	4.08	4.95
6 1971 - 1972	3.11	3.06	3.29	3.77
4 1973 - 1974	2.81	-	2.78	4.05
4 Prototype, 75	.35	.50	.45	.65
1 Rotary	3.26	-	4.01	4.76
1 Diesel	.36	.19	.39	.67
1 PROCO	.19	.14	.08	.11

Table 6. CARBON MONOXIDE EMISSIONS AVERAGED FOR VEHICLE GROUPS

		CO emissions, g/mile			
Test ambient....		20° F	50° F	75° F	110° F
	WEIGHTED COMPOSITE				
	Vehicles				
3	1967	137	130	118	125
6	1969 - 1970	73	56	46	48
6	1971 - 1972	78	60	43	56
4	1973 - 1974	74	-	43	63
4	Prototype, 75	28	15.8	5.5	6.1
1	Rotary	16.8	-	19.2	24.0
1	Diesel	1.9	1.4	1.4	1.2
1	PROCO	1.8	.6	.7	.4
	COLD TRANSIENT PHASE				
3	1967	295	238	169	128
6	1969 - 1970	211	136	96	48
6	1971 - 1972	225	162	75	42
4	1973 - 1974	227	-	85	69
4	Prototype, 75	126	68	17	10
1	Rotary	36	-	26	28
1	Diesel	3.2	1.5	1.5	1.9
1	PROCO	8.1	2.4	2.8	1.1
	STABILIZED PHASE				
3	1967	105	110	114	127
6	1969 - 1970	41	36	35	45
6	1971 - 1972	32	28	23	44
4	1973 - 1974	57	-	51	86
4	Prototype, 75	1.2	1.5	1.2	1.9
1	Rotary	6.4	-	11.4	16.9
1	Diesel	1.6	1.4	1.5	1.1
1	PROCO	.2	.1	.2	.2
	HOT TRANSIENT PHASE				
3	1967	78	86	87	113
6	1969 - 1970	31	32	33	55
6	1971 - 1972	23	20	23	49
4	1973 - 1974	49	-	48	83
4	Prototype, 75	4.8	4.1	5.2	11.0
1	Rotary	22	-	28	37
1	Diesel	1.5	1.3	1.2	1.1
1	PROCO	.3	.2	.1	.1

Table 7. OXIDES OF NITROGEN EMISSIONS AVERAGED FOR VEHICLE GROUPS

		NO$_x$ emissions, g/mile			
Vehicles	Test ambient....	20° F	50° F	75° F	110° F
	WEIGHTED COMPOSITE				
3	1967	5.9	5.1	4.5	4.0
6	1969 - 1970	8.9	7.8	6.9	6.7
6	1971 - 1972	7.0	7.0	6.0	4.8
4	1973 - 1974	3.3	-	2.3	2.4
4	Prototype, 75	3.1	3.1	2.3	2.4
1	Rotary	2.0	-	1.3	.6
1	Diesel	2.1	2.0	1.8	1.9
1	PROCO	1.4	1.3	1.1	1.1
	COLD TRANSIENT PHASE				
3	1967	4.4	4.5	4.7	5.2
6	1969 - 1970	7.3	7.1	6.7	7.6
6	1971 - 1972	6.2	6.8	6.7	7.1
4	1973 - 1974	2.9	-	2.8	3.1
4	Prototype, 75	3.6	3.5	2.7	2.7
1	Rotary	2.6	-	1.5	.7
1	Diesel	2.1	2.1	1.8	1.9
1	PROCO	1.9	1.7	1.4	1.3
	STABILIZED PHASE				
3	1967	5.6	4.6	3.8	3.3
6	1969 - 1970	8.6	7.3	6.4	6.2
6	1971 - 1972	6.9	6.9	5.7	5.2
4	1973 - 1974	3.4	-	2.4	2.4
4	Prototype, 75	3.0	2.9	2.1	2.3
1	Rotary	1.6	-	1.0	.5
1	Diesel	2.1	2.0	1.9	2.0
1	PROCO	1.1	1.0	.9	.9
	HOT TRANSIENT PHASE				
3	1967	7.6	6.5	5.8	4.6
6	1969 - 1970	10.8	9.4	8.0	7.0
6	1971 - 1972	9.5	9.0	7.2	6.9
4	1973 - 1974	4.4	-	3.0	2.7
4	Prototype, 75	3.1	3.1	2.5	2.3
1	Rotary	2.3	-	1.7	.7
1	Diesel	1.9	1.8	1.6	1.7
1	PROCO	1.4	1.3	1.2	1.2

in normal post combustion oxidation and, as applicable, augmented exhaust conversion.

The effect of reduced temperature is particularly striking with respect to the catalyst-equipped cars but primarily because of the low reference level, i.e., the emissions levels at 70° F. In the case of the catalyst cars, the full degradation of control at low temperature is attributable to the cold start contribution to the composite emissions (Figure 5).

In general, emissions increased also as test temperature was raised above 75° F. The effect probably is due to mixture enrichment from vapor being fed both from the carburetor and from components of the evaporative loss control system. The effect probably is not serious except as inordinately-high vapor pressure fuels may be involved.

The explanation for change in NO_x emissions with change in ambient is less clear (Figure 6). However, again referring to the contributions of the individual test phases, it is to be seen that the increased NO_x at low ambients is attributable to the effect on the warmed-up engine. Possibly an explanation that more nearly approaches full rationalization of the effect could be deduced from critical examination of the detailed data. Such examination is beyond the scope of the contractor's obligation in the study, but further analysis of the data independent of this currently-reported study is suggested.

When HC and CO emissions from the catalyst cars are compared with those from the 1969-70 models, reductions (Table 8) of about 90% are seen at the 75° F ambient temperature (the 1970 Clean Air Act mandated 90% reductions in HC and CO). For HC emissions, that degree of reduction is maintained fairly well across the temperature range -- 83% reduction is 20° F, 90% reduction at 110° F. With CO, however, the reductions are not as great at the lower temperatures - only 62% reduction at 20° F - although remaining high at 110° F -- 87% reduction. Reductions of NO_x of 55 to 60% are seen when the catalyst cars are compared with 1971-72 models as the baseline.

Detailed data on the emissions measurements, including data calculated for the separate phases of the Federal Test Procedure, are given in Appendix B. In the process of reducing and compiling the data, it was convenient to calculate values that relate to relative rates of emissions during the separate phases of the Federal Test Procedure. These data have been found useful in more clearly establishing that period of the tests when the temperature effects are most prominent. Further analysis and discussion of the data thus generated is beyond the scope of this report, but the data are given in Appendix F to be conveniently available for further analysis.

Table 8. EMISSIONS REDUCTIONS--CATALYST CARS

	Reductions from 1969-70 baseline emission values*, pct			
Test ambient.........	20° F	50° F	75° F	110° F
Hydrocarbon	83	85	90	90
Carbon monoxide	62	72	88	87
Oxides of nitrogen*	55	59	61	59

*Oxides of nitrogen baseline: 1971-72

Results of the study show hydrocarbon reactivity to be, overall, little affected by change in ambient temperature. Composite emissions (Figure 7, Table 9) show virtually no systematic altering of HC reactivity with change in temperature, but some pattern is found in data for the different test phases. Within the phases of the FTP, the following occur: (1) In the cold transient phase (bag 1) the proportion of methane in the HC emissions is increased at low test ambient temperatures. The trend may be accounted for by generally richer mixtures that are provided during cold start and warmup (methane and acetylene yields are accentuated by mixture enrichment). (2) The proportion of total non-reactive HC produced during stabilized (bag 2) and hot transient (bag 3) phases generally increase as the test ambient temperature rises. This effect probably is accounted for by higher combustion and operating temperatures that tend to diminish the amount of reactive fuel components and combustion fragments that are left unburned. The effect is particularly noticeable in the case of the catalyst cars; catalyst conversion efficiency for the heavier hydrocarbons, enhanced at higher operating temperature, probably is involved.

The directional trends as summarized above are similar for catalyst and non-catalyst cars. Quantitatively, however, there are marked differences between the catalyst and the non-catalyst cars in that emissions from

Table 9. HYDROCARBON REACTIVITY--VARIATION WITH AMBIENT TEMPERATURE

Test ambient.......	20° F	50° F	75° F	110° F
	Methane fraction of total hydrocarbon, wt pct			
Production Vehicles				
Composite emissions	9	8	5	6
Cold transient phase	12	12	7	5
Stabilized phase	6	6	4	7
Hot transient phase	4	5	4	6
Catalyst Vehicles				
Composite emissions	19	21	18	24
Cold transient phase	18	21	14	13
Stabilized phase	28	31	36	46
Hot transient phase	22	15	18	21
	Total non-reactive fraction of total hydrocarbon, wt pct *			
Production Vehicles				
Composite emissions	21	20	20	20
Cold transient phase	30	29	24	20
Stabilized phase	14	14	18	20
Hot transient phase	14	14	19	21
Catalyst Vehicles				
Composite emissions	29	32	29	32
Cold transient phase	29	33	25	24
Stabilized phase	36	38	48	55
Hot transient phase	30	20	26	28

* Total non-reactive hydrocarbon defined as the sum of methane, ethane, propane, acetylene, and benzene.

the catalyst cars generally have a greater proportion of non-reactive hydrocarbon. A characteristic of the hydrocarbon from the catalyst cars is the high proportion of methane in the total non-reactive fraction. Whereas the methane fraction from the production cars ranges between 25 and 40 pct of the total non-reactive fraction, the comparable range for the catalyst cars is roughly 60 pct to 80 pct, or about twice that of the non-catalyst cars. Detailed data are included in Appendix C.

ALDEHYDE EMISSIONS

Aldehyde emissions (Table 10) associated with the production vehicles were found to increase by about one-third as ambient temperature decreased from 110° to 20° F. The trend is consistent in data from all test phases and the differences, although small, are believed to be real. However, the significance of the small differences--and, hence, the significance of the observed temperature sensitivity--are unknown.

The absolute levels of aldehydes from all categories of low emission test vehicles were markedly reduced from levels found with the production vehicles, and the differences that were measured may not be real. Considering all test phases, however, there appears to be an aldehyde temperature sensitivity with the low emission cars that roughly parallels the sensitivity found for the production vehicles. The diesel is an exception--no evidence of aldehyde-yield sensitivity to temperature appears in results from the diesel.

TEMPERATURE OF MINIMAL EMISSIONS

The results of experimental work to determine more precisely the temperature of maxima and minima in emissions are reported in detail in Appendix D. The summary data also are shown in Table 11 and in Figures 2-4, designated three 1974 cars. Within the temperature range 60° to 90° F these data showed minimal CO and HC emissions at 80° F and maximum NO_x emissions at 75° F. Extrapolating other data in the study however, it would be expected that NO_x emissions again would increase at some temperature below the 60° F value of the special series of tests.

FUEL ECONOMY AND EFFECTS OF OPERATING VEHICLE AIR CONDITIONER

The effect of ambient temperature on fuel economy (Table 12) was readily measurable and averaged about a 10 pct economy loss with change from 75° to 20° F temperature. The economy data are believed valid only for an indication of general trends to be expected and are not to be construed as indicative of the fuel economy characteristics of any group of vehicles in the test.

Table 10. ALDEHYDE EMISSIONS--VARIATION WITH AMBIENT TEMPERATURE

	Variation, g/mile			
Test ambient.......	20° F	50° F	75° F	110° F
Production Vehicles				
Composite	0.23	0.20	0.18	0.17
Cold Transient Phase	0.23	0.18	0.16	0.17
Stabilized Phase	0.24	0.22	0.20	0.18
Hot Transient Phase	0.20	0.20	0.17	0.14
Catalyst Vehicles				
Composite	0.035	0.035	0.03	0.02
Cold Transient Phase	0.07	0.05	0.04	0.04
Stabilized Phase	0.03	0.03	0.03	0.02
Hot Transient Phase	0.02	0.03	0.03	0.01
Diesel Vehicle				
Composite	0.05	0.04	0.05	0.05
Cold Transient Phase	0.10	0.04	0.05	0.05
Stabilized Phase	0.04	0.04	0.06	0.05
Hot Transient Phase	0.04	0.03	0.04	0.06

Table 11. EMISSIONS DATA FOR THREE 1974 VEHICLES--SUMMARY AVERAGES

	Emissions, g/mile			
Test ambient....	60° F	70° F	80° F	90° F
	HYDROCARBON			
Test Phase				
Cold transient, g/test...	13.7	10.3	9.4	7.1
Stabilized, g/test.......	5.8	5.7	5.4	5.9
Hot transient, g/test....	7.0	7.4	7.5	8.2
Weighted composite,g/mile	2.1	1.9	1.8	1.8
	CARBON MONOXIDE			
Cold transient, g/test...	287	173	135	126
Stabilized, g/test.......	72	69	67	74
Hot transient, g/test....	79	81	87	105
Weighted composite,g/mile	32	25	23	25
	OXIDES OF NITROGEN			
Cold transient, g/test...	10.8	11.3	10.6	9.7
Stabilized, g/test.......	9.0	9.4	9.2	9.0
Hot transient, g/test....	10.3	10.2	9.9	9.6
Weighted composite,g/mile	2.6	2.7	2.6	2.5
	FUEL ECONOMY			
Cold transient, g/test...	1,181	1,147	1,100	1,071
Stabilized, g/test.......	1,204	1,129	1,213	1,202
Hot transient, g/test....	974	976	965	958
Weighted composite. miles/gallon	9.26	9.22	9.40	9.52

Table 12. FUEL ECONOMY--AVERAGES FOR VEHICLES GROUPED BY AGE AND CONTROL TECHNOLOGY EMPLOYED

	Fuel economy, miles per gallon			
Test ambient....	20° F	50° F	75° F	110° F
WEIGHTED COMPOSITE				
Vehicles				
3 1967	10.7	11.3	11.8	11.7
6 1969 - 1970	10.5	11.3	11.7	11.9
6 1971 - 1972	9.8	-	10.8	10.0
4 1973 - 1974	10.3	-	11.3	11.2
4 Prototype, 75	9.6	10.3	10.8	11.4
1 Rotary	11.5	-	11.5	11.7
1 Diesel	17.1	18.6	19.7	20.1
1 PROCO	19.3	20.4	21.2	20.5
COLD TRANSIENT PHASE				
3 1967	7.7	8.9	10.5	11.3
6 1969 - 1970	7.9	9.5	10.6	12.1
6 1971 - 1972	7.4	8.6	10.0	11.4
4 1973 - 1974	7.1	-	9.3	10.2
4 Prototype, 1975	7.8	9.2	10.2	11.3
1 Rotary	10.7	-	11.8	13.0
1 Diesel	13.5	16.1	17.1	18.8
1 PROCO	18.0	21.0	22.5	22.8
STABILIZED PHASE				
3 1967	11.5	11.6	11.6	11.3
6 1969 - 1970	10.8	11.3	11.5	11.3
6 1971 - 1972	10.0	10.4	10.4	10.4
4 1973 - 1974	9.3	-	9.4	9.1
4 Prototype, 1975	9.4	9.8	10.2	10.6
1 Rotary	10.6	-	10.4	10.5
1 Diesel	17.9	18.9	19.9	20.1
1 PROCO	18.2	18.7	19.1	18.7
HOT TRANSIENT PHASE				
3 1967	12.9	12.6	13.2	12.7
6 1969 - 1970	12.4	12.6	12.8	12.8
6 1971 - 1972	11.9	12.2	12.3	12.3
4 1973 - 1974	10.9	-	11.1	10.6
4 Prototype, 1975	11.1	11.5	11.7	12.2
1 Rotary	14.5	-	14.2	13.4
1 Diesel	19.3	20.5	21.6	21.2
1 PROCO	23.0	24.3	25.4	23.2

The effect of air conditioner operation at 110° F ambient on vehicle emissions and fuel consumption was obtained from data on 13 production vehicles and the four prototype low emission vehicles. The results are summarized in Table 13; values for each phase and individual vehicles are in Appendix B.

In brief, operating the vehicle air conditioner at the elevated ambient was found to increase composite cycle emissions of the production vehicles by 15% for HC, 20% for CO, and 30% for NO_x. These increased emissions were paralleled with fuel economy decreased by about 10%.

Considering the four prototype vehicles, air conditioner operation increased HC by an average of about 8%, CO by 95%, and NO_x by 13%. As with the production vehicles the prototypes suffered about 10% fuel economy loss attributable to air conditioner operation.

PINTO SPECIAL TESTS

In a special test of the catalyst-equipped Pinto, data were taken both with the catalyst installed and with it removed. Results, Table 14, show the marked effect of the catalyst at normal ambient with progressively less effect as the test temperature was lowered. Again it is to be observed that the determination is accounted for by emissions during the cold start phase of the test.

Table 13. EFFECT OF OPERATING VEHICLE AIR CONDITIONERS CONSIDERING EMISSIONS AND FUEL ECONOMY--TESTS AT 110° F AMBIENT

Change Attributable to Operating Air Conditioners

	13 Production vehicles	4 Prototype vehicles
	EMISSIONS	
Hydrocarbon, g/mile	+ .58 (15%)	+ .04 (8%)
Carbon monoxide, g/mile	+14.5 (20%)	+ 5.8 (95%)
Oxides of nitrogen, g/mile	+ 1.5 (34%)	+ .31 (13%)
	FUEL ECONOMY	
Miles/gallon	- 1.24 (11%)	- 1.15 (10%)

Table 14. EMISSIONS WITH AND WITHOUT CATALYST*
FORD PINTO VEHICLE NO. 56

Test ambient......	20° F	50° F	75° F	110° F
CARBON MONOXIDE, grams/test				
Cold transient phase				
With catalyst........	434	250	83	57
Without catalyst.....	485	328	209	155
Stabilized phase				
With catalyst........	12	16	13	21
Without catalyst.....	92	90	102	126
Hot transient phase				
With catalyst........	46	30	37	64
Without catalyst.....	128	109	105	155
1975 CVS composite, grams/mile				
With catalyst........	30	19	9	11
Without catalyst.....	49.8	39	34	37
HYDROCARBON, grams/test				
Cold transient phase				
With catalyst........	12.99	5.14	2.03	1.57
Without catalyst.....	21.17	8.25	4.69	3.74
Stabilized phase				
With catalyst........	.27	.33	.29	.36
Without catalyst.....	1.23	1.05	1.01	1.19
Hot transient phase				
With catalyst........	.74	.94	.88	2.88
Without catalyst.....	2.58	2.23	2.13	3.37
1975 CVS composite, grams/mile				
With catalyst........	.84	.41	.22	.36
Without catalyst.....	1.58	.79	.57	.63
OXIDES OF NITROGEN, grams/test (uncorrected except for 75° F tests)				
Cold transient phase				
With catalyst........	8.7	9.6	10.2	9.3
Without catalyst.....	12.2	11.8	12.6	9.0
Stabilized phase				
With catalyst........	5.8	4.2	3.0	2.6
Without catalyst.....	11.9	4.7	3.7	3.0
Hot transient phase				
With catalyst........	6.0	6.0	4.8	4.1
Without catalyst.....	7.7	7.3	5.9	4.6
1975 CVS composite, grams/mile				
With catalyst........	1.7	1.6	1.4	1.2
Without catalyst.....	2.9	1.9	1.7	1.3

* Catalyst chamber removed from vehicle set up for use of catalyst; no other changes or adjustments made.

Table 14. EMISSIONS WITH AND WITHOUT CATALYST*
FORD PINTO VEHICLE NO. 56--Continued

Test ambient.....	20° F	50° F	75° F	110° F
ALDEHYDES, total grams/test as HCHO				
Cold transient phase				
With catalyst........	0.12	0.07	0.03	0.07
Without catalyst.....	.45	.32	.34	.26
Stabilized phase				
With catalyst........	.00	.00	.01	.01
Without catalyst.....	.22	.15	.18	.26
Hot transient phase				
With catalyst........	.01	.01	.01	.02
Without catalyst.....	.23	.22	.24	.32
1975 CVS composite, grams/mile				
With catalyst........	.01	.01	.00	.01
Without catalyst.....	.072	.06	.063	.074
CORRECTED OXIDES OF NITROGEN, grams/test				
Cold transient phase				
With catalyst........	6.7	7.7	10.2	8.4
Without catalyst.....	9.3	9.7	12.6	9.0
Stabilized phase				
With catalyst........	4.4	3.4	3.0	2.4
Without catalyst.....	9.0	3.8	3.7	3.0
Hot transient phase				
With catalyst........	4.6	4.8	4.8	3.7
Without catalyst.....	5.9	6.0	5.9	4.7
1975 CVS composite, grams/mile				
With catalyst........	1.3	1.3	1.4	1.1
Without catalyst.....	2.2	1.5	1.7	1.3

* Catalyst chamber removed from vehicle set up for use of catalyst; no other changes or adjustments made.

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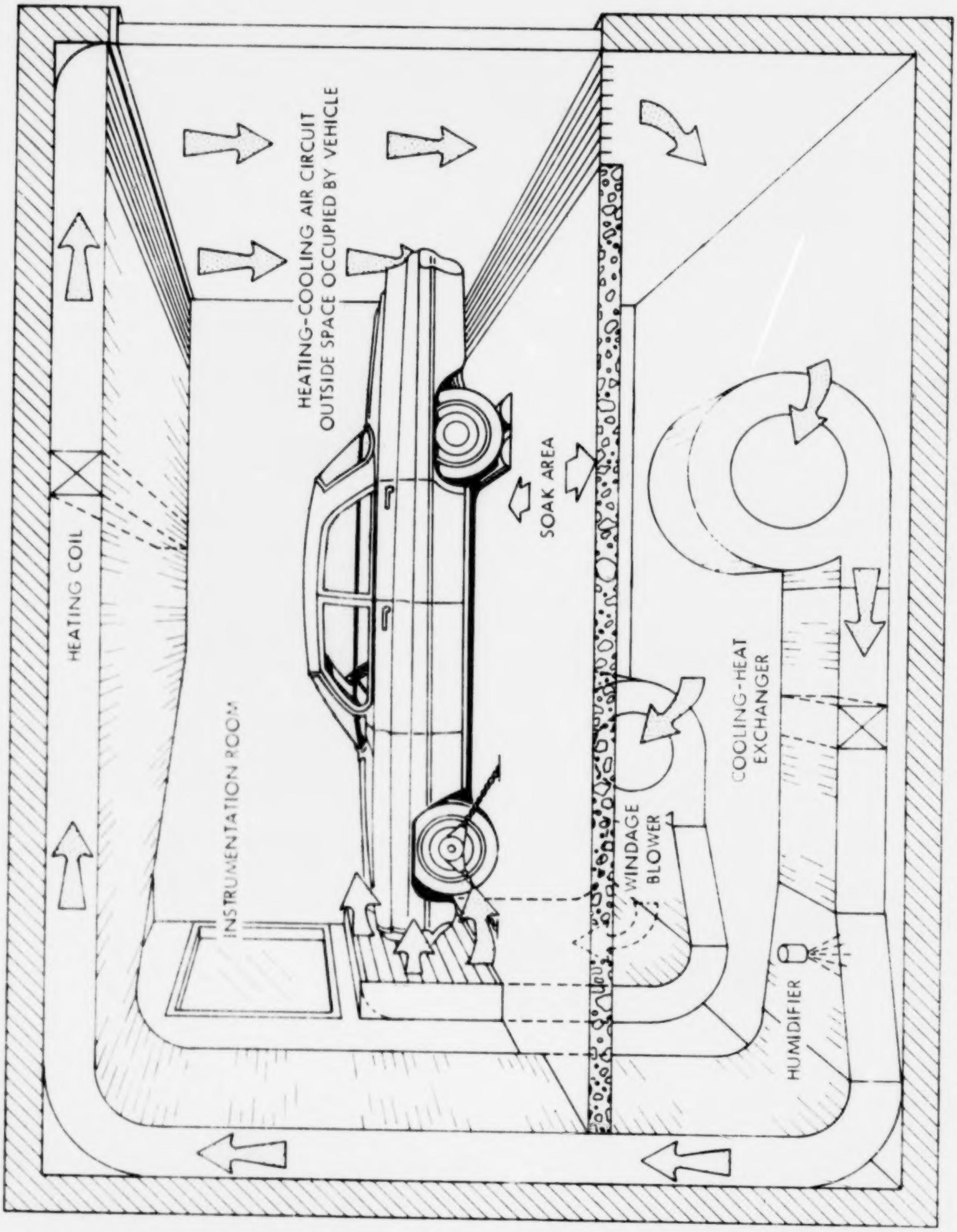
HEATING-COOLING AIR CIRCUIT
OUTSIDE SPACE OCCUPIED BY VEHICLE
HEATING COIL
SOAK AREA
INSTRUMENTATION ROOM
COOLING-HEAT EXCHANGER
WINDAGE BLOWER
HUMIDIFIER

Figure 1. Controlled ambient chassis dynamometer test facility

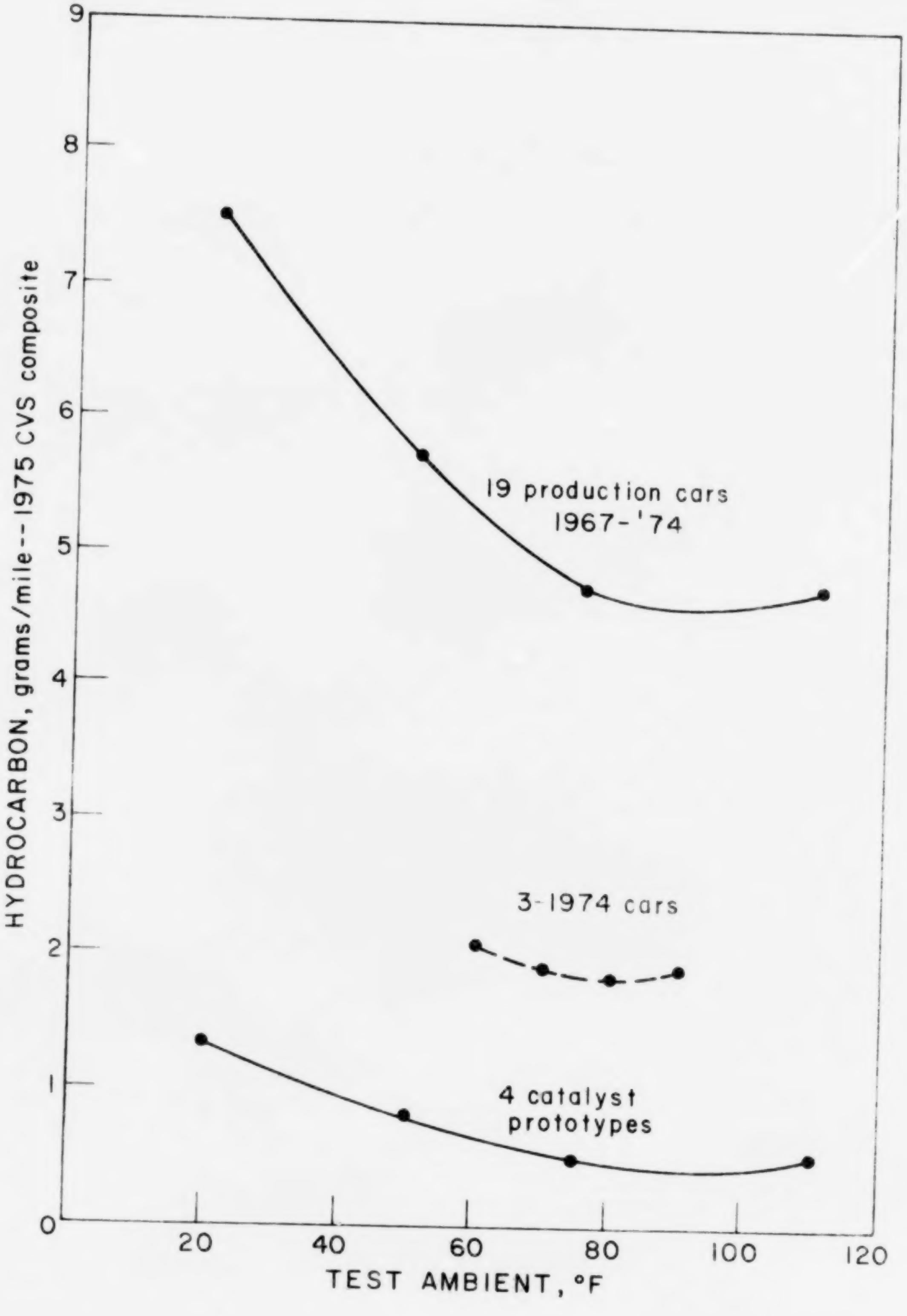

Figure 2. Trends--ambient influence on emissions--hydrocarbon

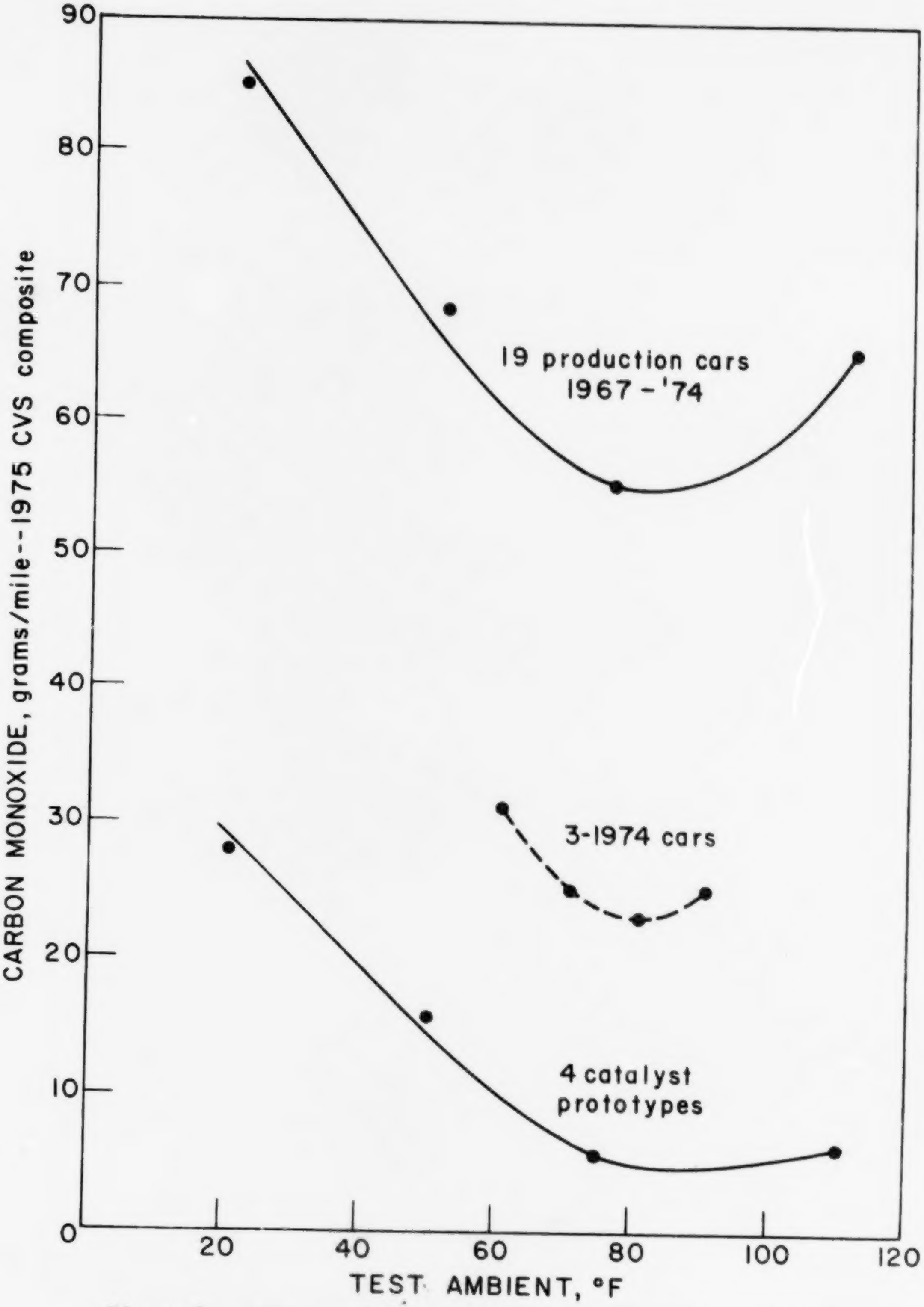

Figure 3. Trends--ambient influence on emissions--carbon monoxide

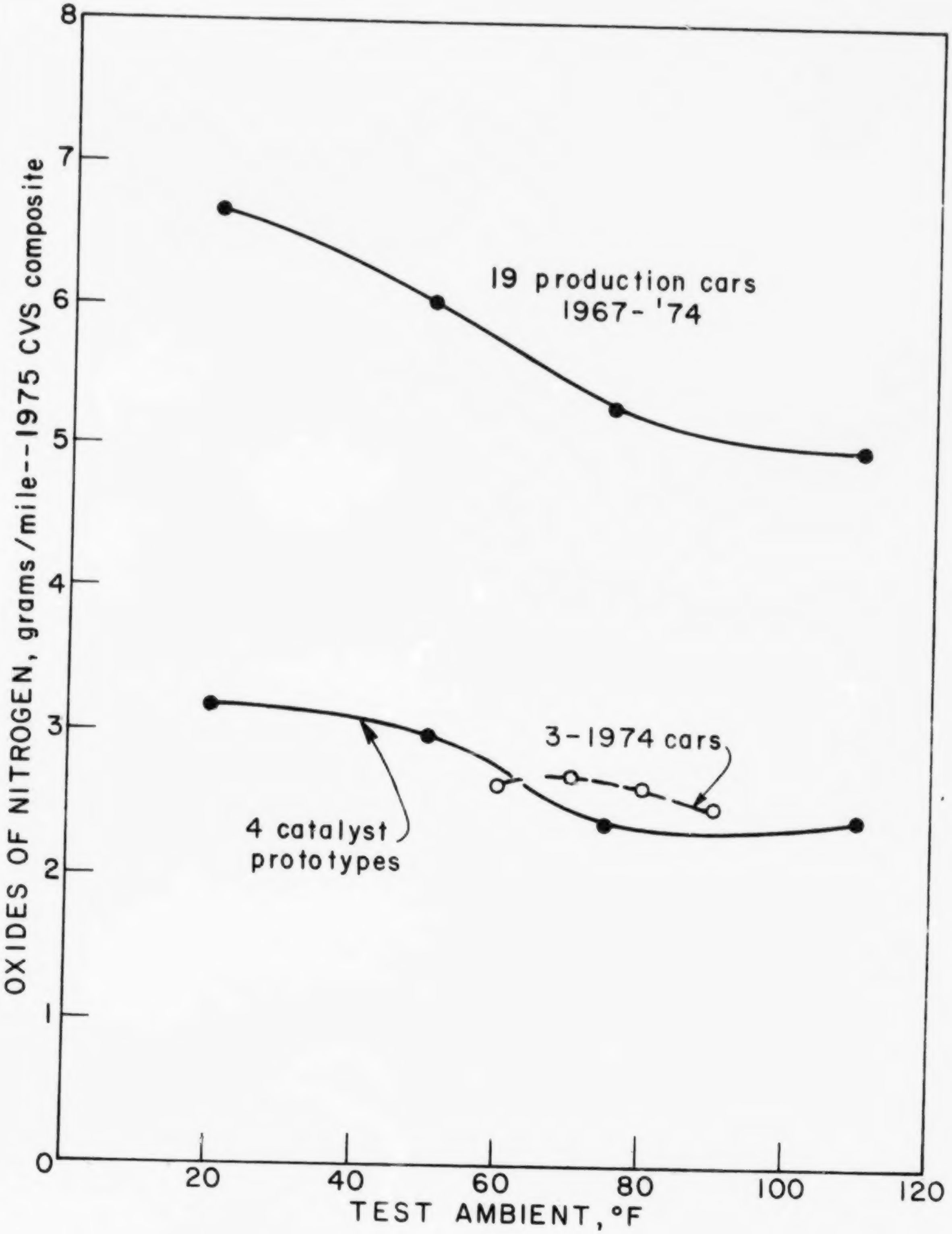

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Figure 4. Trends--ambient influence on emissions--oxides of nitrogen

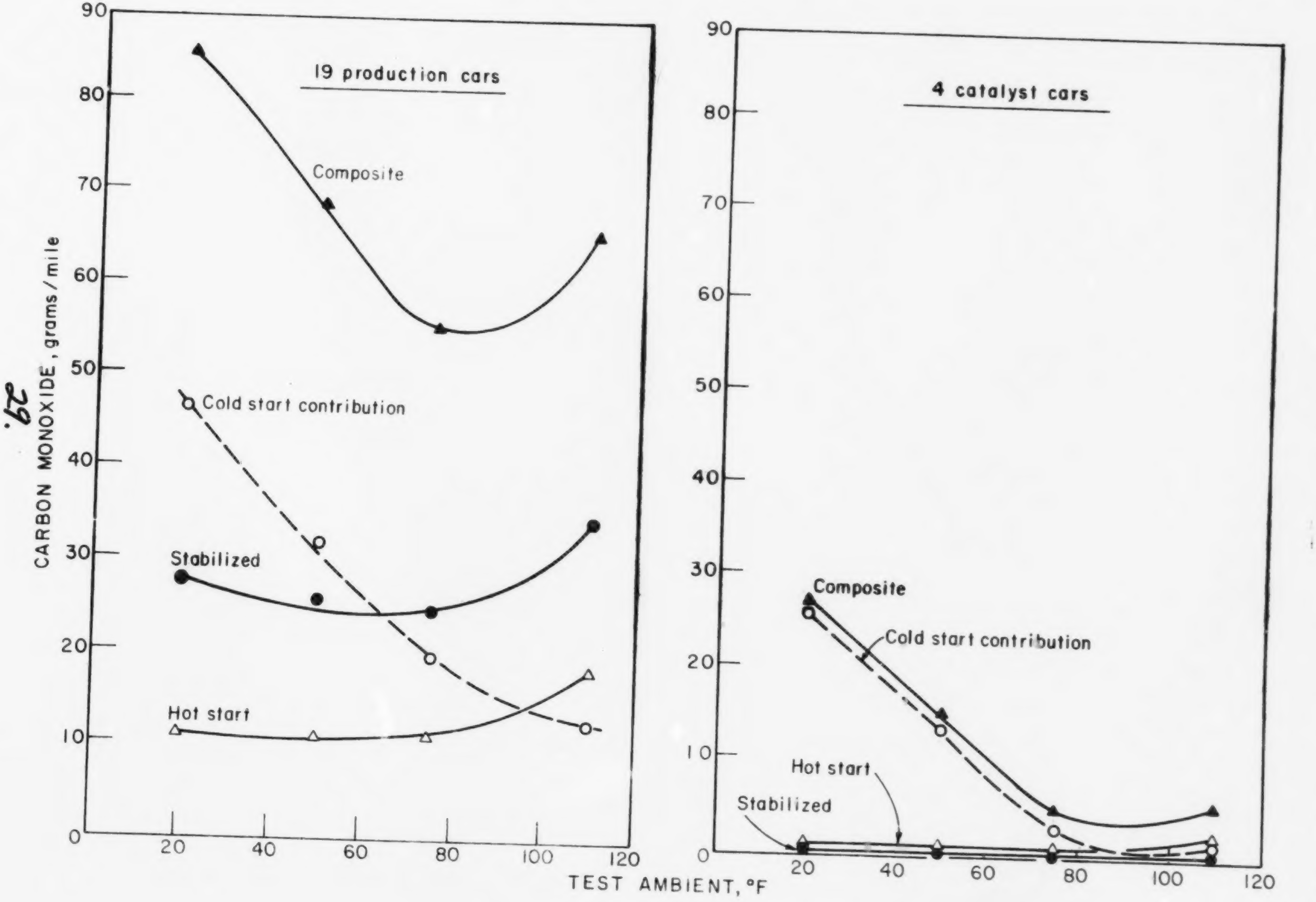

Figure 5. Contributions of test segments to measured

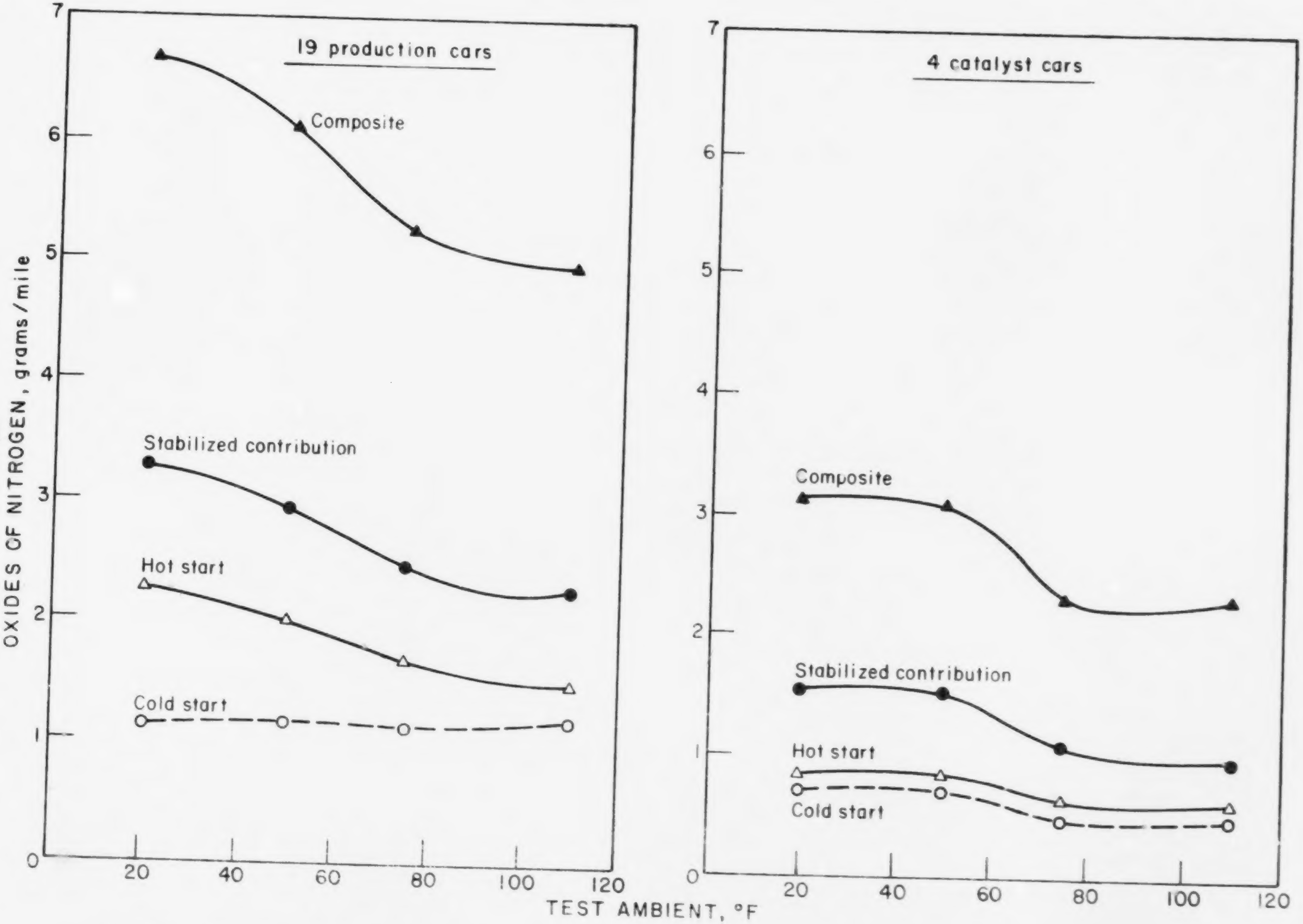

Figure 6. Contributions of test segments to measured emissions--oxides of nitrogen

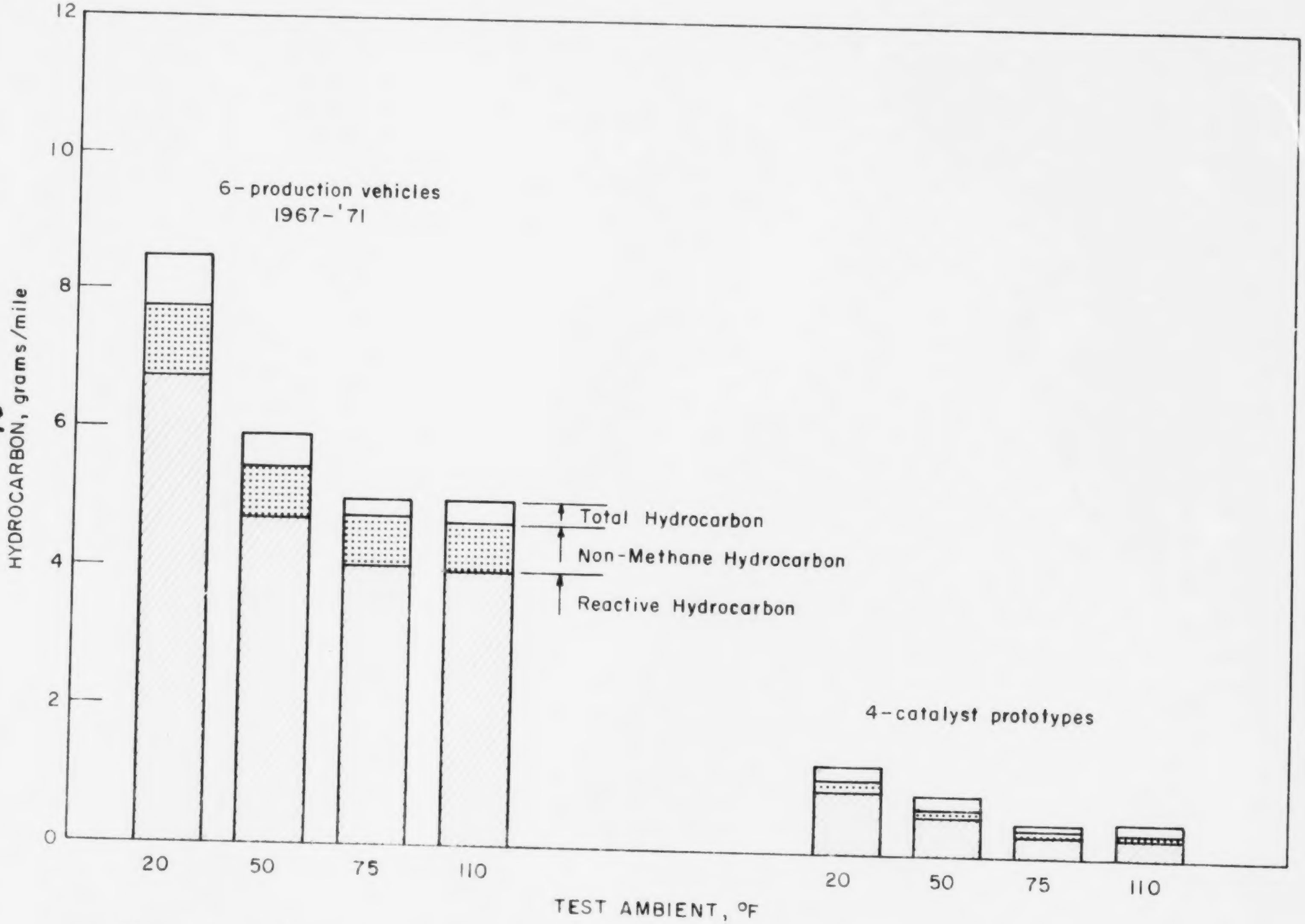

Figure 7. Exhaust reactivity at varied ambients

APPENDIX A (10 pages)

Hood-up -- Hood-down Emissions Comparisons

As stated in the body of the report the hood-down procedure was used because the original concept of the temperature effects program was to duplicate as closely as possible typical vehicle user practice at varied ambient conditions and to determine emissions as they would be generated under these conditions. However, it was also desired to know the relationships between data taken with the hood down and the constant velocity cooling and hood-up of the FTP.

To provide information on this question--involving primarily hood configuration and windage--back-to-back experiments were made with the vehicle hood alternatively up or down. Similar experiments were made with the windage varied. In some tests a standard 12-hour soak period was allowed prior to test, but to obtain more data in a shorter time, in other tests the procedure was modified to incorporate rapid vehicle cool-down. In this rapid cool-down procedure, the control for cool-down was based upon regaining fixed stationary temperatures for critical items. In all, 48 validation tests were made at temperatures from 20° to 110° F and were made using both production and low emission prototype vehicles. The results provided data that would, dependent upon findings, (1) validate the results of this study as directly comparable with results to be expected using the FTP, or, (2) provide a basis for estimating the degree to which the procedural deviations might cause difference in measurements attributable to the differences in procedure.

Table A-1 presents a composite of data taken from Tables A-2 through A-9 for both production and prototype catalyst vehicles. It was concluded from the data of the tables that a significant difference in emissions measurements would not occur in measurements in the range of 75° F between the two procedures. It was somewhat surprising to the investigators that a difference did not occur at the temperature extremes of 20° and 110° F. Data accumulated during the project and analyzed for 19 vehicles at all test conditions for the repeatability of replicates yielded standard deviation values in terms of pct of the measured emissions of 10%, 7%, and 8% for CO, HC, and NO_x, respectively for the production vehicles and 17%, 15%, and 9% for the low emission prototype vehicles. This information strengthens the conclusion that significant differences do not occur between the two hood configuration procedures as conducted in our laboratory.

Table A-1 - Effects Upon Emissions Observed in Comparative Tests Using Alternate Vehicle Cooling Procedures 1/

	FTP[1] emissions, gm/mile		
	HC	CO	NO_x
Production Vehicles[2]			
20° F Ambient:			
Average	6.38	106.1	5.48
Difference[3], absolute	0.34	5.7	-0.53
Difference, pct	5	6	-9
75° F Ambient:			
Average	3.37	70.3	3.39
Difference, absolute	0.26	2.7	0.07
Difference, pct	8	4	2
110° F Ambient:			
Average	3.84	87.2	2.63
Difference, absolute	-0.42	-3.34	-0.03
Difference, pct	-10	-4	-1
Catalyst Vehicles[4]			
20° F Ambient:			
Average	1.18	26.1	2.75
Difference, absolute	.00	0.27	0.09
Difference, pct	0	1	3
110° F Ambient:			
Average	4.81	0.46	3.62
Difference, absolute	0.91	0.08	0.04
Difference, pct	19	17	1

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[1] Standard procedure essentially as per FTP (hood up, with supplemental low velocity cooling). Modified procedure hood down with windage across full frontal area of vehicle with velocity keyed to roll speed.

[2] Cars 39, 41, and 42. Duplicate tests at 20° and 110° F; triplicate tests at 75° F.

[3] Difference defined as (Results with Standard procedure) minus (Results with Modified procedure).

[4] Cars 43 and 46. Triplicate tests.

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TABLE A-2. Hood up--hood down emissions comparisons with 12 hour soak

(Car Nos. 39 and 41, at 20° F ambient 1/)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test			Hot transient, grams/test			1975 CVS weighted, grams/mile		
		CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x
VEHICLE NO. 39													
4739	Up	1017.10	50.80	17.70	374.80	15.10	22.50	220.50	11.30	28.10	119.00	5.80	6.70
4742	Down	1072.50	58.30	15.70	377.20	18.30	21.10	236.30	15.80	29.10	129.70	6.98	5.92
Difference Down-Up:													
Grams..........		55.40	7.50	- 2.00	2.40	3.20	-1.40	15.80	4.50	1.00	10.70	1.18	-0.78
Percent........		5	15	-11	1	21	-6	7	40	4	9	20	-12
VEHICLE NO. 41													
4744	Up	718.07	59.06	15.80	257.30	16.97	16.74	157.70	12.67	21.42	87.46	6.61	4.77
4745	Down	748.20	54.80	15.70	240.30	15.49	15.56	174.60	11.94	19.98	88.20	6.11	4.49
Difference Down-Up:													
Grams..........		30.13	-4.26	- 0.10	-17.00	-1.48	-1.18	16.90	-0.73	-1.44	0.74	-0.50	-0.28
Percent..		4	-7	- 1	- 7	-9	-7	11	-6	-7	1	-8	-6
AVERAGE													
	Up	867.59	54.93	16.75	316.05	16.04	19.62	189.10	11.99	24.76	103.23	6.21	5.74
	Down	910.35	56.55	15.70	308.75	16.90	18.33	205.45	13.87	24.54	108.95	6.55	5.21
Difference Down-Up:													
Grams..........		42.76	1.62	- 1.05	- 7.30	0.86	-1.29	16.35	1.88	-0.22	5.72	0.34	-0.53
Percent........		5	3	- 6	- 2	5	-7	9	16	-1	6	5	-9

1/ Soaked at test temperature 12 hours or more.

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

NOTE.-NO_x not corrected to air moisture content of 75 grains.

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TABLE A-3. Hood up--hood down emissions comparisons with 12 hour soak

(Car Nos. 39, 41, and 42, at 75° F ambient 1/)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test			Hot transient, grams/test			1975 CVS weighted, grams/mile		
		CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x
VEHICLE NO. 39													
4727	Up	310.30	16.03	21.76	297.60	12.92	18.98	200.00	11.67	25.00	72.67	3.53	5.68
4738	Up	347.38	18.74	20.48	335.11	14.52	17.66	214.50	11.39	22.19	80.90	3.88	5.22
Average	Up	328.84	17.39	21.12	316.36	13.72	18.32	207.25	11.53	23.60	76.79	3.71	5.45
4728	Down	377.50	18.40	21.50	283.20	13.30	19.40	184.20	12.10	25.60	73.40	3.75	5.76
4734	Down	343.00	16.58	22.03	325.80	14.47	19.26	216.19	14.84	26.94	79.60	4.01	5.88
Average	Down	360.25	17.49	21.77	304.50	13.89	19.33	200.20	13.47	26.27	76.50	3.88	5.82
Difference Down-Up: Grams..........		31.41	0.10	0.65	-11.86	0.17	1.01	- 7.05	1.94	2.67	-0.29	0.17	0.37
Percent........		10	1	3	- 4	1	6	- 3	17	11	0	5	7
VEHICLE NO. 41													
4731	Up	249.80	13.40	11.50	161.60	10.40	9.40	131.60	8.80	11.50	45.80	2.82	2.79
4725	Up	238.10	13.02	13.30	147.10	9.17	8.63	124.30	8.29	11.18	42.71	2.60	2.73
Average	Up	243.95	13.21	12.40	154.35	9.79	9.02	127.95	8.55	11.34	44.26	2.71	2.76
4730	Down	241.40	13.40	11.10	126.30	10.30	9.20	111.30	8.60	11.60	39.10	2.80	2.70
4737	Down	313.80	21.47	10.11	154.74	13.27	9.14	245.70	4.30	11.04	57.30	3.33	2.60
Average	Down	277.60	17.44	10.61	140.52	11.79	9.17	178.50	6.45	11.32	48.20	3.07	2.65
Difference Down-Up: Grams..........		33.65	4.23	- 1.79	-13.83	2.00	0.15	50.55	- 2.10	-0.02	3.94	0.36	-0.11
Percent........		14	32	-14	- 9	20	2	40	-25	0	9	13	-4
VEHICLE NO. 42													
4732	Up	506.40	18.77	5.77	258.80	10.88	6.90	291.30	10.19	7.47	85.70	3.30	1.82
4729	Down	523.90	18.80	5.94	278.60	12.20	6.70	299.70	11.10	7.75	90.00	3.55	1.80
Difference Down-Up: Grams..........		17.50	0.03	0.17	19.80	1.32	-0.20	8.40	0.91	0.28	4.30	0.25	-0.02
Percent........		3	0	3	8	12	-3	3	9	4	5	8	-1
AVERAGE													
	Up	359.73	16.46	13.10	243.17	11.46	11.41	208.83	10.09	14.14	66.92	3.24	3.35
	Down	370.58	17.91	12.77	241.21	12.63	11.73	226.13	10.34	15.11	71.57	3.50	3.42
Difference Down-Up: Grams..........		10.85	1.45	- 0.33	- 1.96	1.17	0.32	17.30	0.25	0.97	2.65	0.26	0.07
Percent........		3	9	- 3	- 1	10	3	8	2	7	4	8	2

1/ Soaked at test temperature 12 hours or more.

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

NOTE.-NO_x not corrected to air moisture content of 75 grains.

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TABLE A-4.Hood up--hood down emissions comparisons with 12 hour soak

(Car Nos. 39, 41, and 42, at 110° F ambient 1/)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test			Hot transient, grams/test			1975 CVS weighted, grams/mile		
		CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x
VEHICLE NO. 39													
4733	Up	245.40	13.20	18.80	383.70	15.30	15.20	283.60	17.30	18.60	86.80	4.11	4.52
4722	Down	267.80	13.10	18.22	398.12	15.49	14.01	299.37	16.08	19.57	91.20	4.04	4.40
Difference Down-Up:													
Grams..........		22.40	- 0.10	-0.58	14.42	0.19	- 1.19	15.77	- 1.22	0.97	4.40	- 0.07	-0.12
Percent........		9	- 1	-3	4	1	- 8	6	- 7	5	5	- 2	-3
VEHICLE NO. 41													
4736	Up	282.17	15.15	9.01	234.10	14.32	8.48	232.98	14.03	9.80	65.09	3.84	2.39
4724	Down	171.20	10.48	10.46	238.10	13.44	7.62	226.50	14.10	9.85	58.78	3.46	2.36
Difference Down-Up:													
Grams..........		-110.97	- 4.67	1.45	4.00	- 0.88	- 0.86	- 6.48	0.07	0.05	- 6.31	- 0.38	-0.03
Percent........		- 39	-31	16	2	- 6	-10	- 3	1	1	-10	-10	-1
VEHICLE NO. 42													
4735	Up	540.21	22.12	3.77	382.64	13.99	3.86	432.17	14.13	3.72	114.80	4.21	1.01
4723	Down	436.00	15.18	4.82	367.80	12.16	3.83	429.80	12.38	3.76	106.70	3.40	1.07
Difference Down-Up:													
Grams..........		-104.21	- 6.94	1.05	-14.84	- 1.83	- 0.03	- 2.37	- 1.75	0.04	- 8.10	- 0.81	0.06
Percent........		- 19	-31	28	- 4	-13	- 1	- 1	-12	1	- 7	-19	6
AVERAGE													
	Up	355.93	16.82	10.53	333.48	14.54	9.18	316.25	15.15	10.71	88.90	4.05	2.64
	Down	291.67	12.92	11.17	334.67	13.70	8.49	318.56	14.19	11.06	85.56	3.63	2.61
Difference Down-Up:													
Grams..........		- 64.26	- 3.90	0.64	1.19	- 0.84	- 0.69	2.31	- 0.96	0.35	- 3.34	- 0.42	-0.03
Percent........		- 18	-23	6	0	- 6	- 8	1	- 6	3	- 4	-10	-1

1/ Soaked at test temperature 12 hours or more.

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

NOTE.-NO_x not corrected to air moisture content of 75 grains.

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TABLE A-5. - Hood up--hood down emissions comparisons

(Car No. 46, Chevrolet with catalyst)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test			Hot transient, grams/test			1975 CVS weighted, grams/mile		
		CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x
20° F AMBIENT - RAPID COOL DOWN 1/													
4910	Up	257.0	13.71	11.49	0.70	1.34	7.66	6.23	1.17	11.43	15.30	1.05	2.55
4912	Up	267.5	15.92	12.30	.00	1.05	8.79	5.41	1.08	11.96	15.80	1.13	2.79
4914	Up	262.8	14.92	11.91	.70	.79	8.42	6.26	1.00	11.99	15.60	1.04	2.70
Average	Up	262.4	14.85	11.90	.47	1.06	8.29	5.97	1.08	11.79	15.57	1.07	2.68
4911	Down	255.5	13.39	11.89	0.71	1.30	8.15	6.26	1.22	11.99	15.20	1.03	2.68
4913	Down	259.7	16.71	12.46	.71	1.17	8.62	6.19	1.09	12.15	15.50	1.20	2.79
4915	Down	241.5	13.19	12.83	.72	1.13	8.97	6.73	1.08	12.51	14.50	.99	2.88
Average	Down	252.2	14.43	12.39	.71	1.20	8.58	6.39	1.13	12.22	15.07	1.07	2.78
Difference Down-Up:													
Grams..........		-10.1	-0.42	0.49	0.24	0.14	0.29	0.42	0.05	0.43	-0.50	0.00	0.10
Percent........		- 4	-3	4	51	13	4	7	5	4	-3	0	4
110° F AMBIENT - RAPID COOL DOWN 1/													
4917	Up	15.7	4.79	13.06	0.55	0.84	17.29	22.92	1.90	16.38	2.72	0.53	4.30
4919	Up	13.0	4.75	13.81	.70	.78	15.65	18.79	1.51	16.46	[illegible]	.49	4.13
4921	Up	12.8	4.16	13.40	.70	.73	15.26	21.41	1.47	16.23	2.46	.45	4.04
Average	Up	13.8	4.57	13.42	.65	.78	16.07	21.04	1.63	16.35	2.48	.49	4.16
4918	Down	13.5	3.96	13.17	0.56	0.92	16.84	29.07	2.32	17.30	3.06	0.53	4.32
2/4920	Down	15.4	8.11	13.34	1.43	.86	16.40	40.07	2.25	16.12	4.12	.75	4.18
4922	Down	12.4	3.80	12.22	.71	.75	15.76	25.76	1.81	16.46	2.76	.46	4.05
Average	Down	13.0	3.88	12.70	.64	.84	16.30	27.42	2.07	16.88	2.91	.50	4.19
Difference Down-Up:													
Grams..........		0.8	-0.69	-0.72	-0.01	0.06	0.23	6.38	0.44	0.53	0.43	0.01	0.03
Percent........		6	-15	-5	-2	8	1	30	27	3	[illegible]	2	2

1/ Three replicates in one day.
2/ Car died during test, therefore not included in average.

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

TABLE A-6. - Hood up--hood down emissions comparisons

(Vehicle No. 46, 1973 Chevrolet Equipped with Catalyst and Other Advanced Emission Controls, Averaged Vehicle Temperatures During Test)

Time into cycle, minutes	Air to vehicle, °F			Coolant, °F			Oil pan, °F			Air to carburetor, °F			Under hood temp., °F		
	Overnight soak 1/	Rapid cool down 2/		Overnight soak	Rapid cool down		Overnight soak	Rapid cool down		Overnight soak	Rapid cool down		Overnight soak	Rapid cool down	
	Hood down	Hood up	Hood down	Hood down	Hood up	Hood down	Hood down	Hood up	Hood down	Hood down	Hood up 3/	Hood down	Hood down	Hood up	Hood down
COLD START AT 20° F AMBIENT															
0	18	18	18	20	20	20	20	24	23	20	18	18	20	20	20
8.4	23	21	23	148	147	138	106	103	97	82	72	72	64	66	61
22.9	24	23	24	176	169	160	156	140	147	80	76	78	86	82	79
HOT START AT 20° F AMBIENT FOLLOWING 10-MINUTE SOAK															
0	22	21	22	205	181	185	142	126	132	89	76	82	106	101	104
8.4	26	23	25	174	174	162	162	158	155	22	70	80	80	79	76
COLD START AT 110° F AMBIENT															
0	106	107	108	108	109	108	96	112	112	4/	107	106	108	107	106
8.4	108	109	110	202	202	202	175	186	181		121	124	118	115	120
22.9	111	108	111	207	205	202	216	209	212		123	133	134	125	134
HOT START AT 110° F AMBIENT FOLLOWING 10-MINUTE SOAK															
0	110	110	111	232	227	231	197	192	198		136	146	156	146	154
8.4	111	110	110	206	206	205	222	224	218		124	131	132	125	132

1/ Single test only; others average of three tests.
2/ Forced cooldown. Coolant circulated through radiator and block with air to radiator at 15-20 mph.
3/ Thermocouple problems--single test at 20°, two at 110°.
4/ Thermocouple failure.

NOTE.--Thermocouple locations: Air to vehicle--ahead of radiator near source; coolant--in or close to engine block; oil--in oil drain plug; air to carburetor--in air at center of air filter or following air filter; under hood--in air space under carburetor.

TABLE A-7. - Hood up--hood down emissions comparisons

(Vehicle No. 46, 1973 Chevrolet Equipped with Catalyst and Other Advanced Emission Controls, Vehicle Temperatures During Test)

Time into cycle, minutes	Air to vehicle				Coolant				Oil				Air to carburetor				Under hood temperature, °F			
	Overnight soak	Rapid cool down test			Overnight soak	Rapid cool down test			Overnight soak	Rapid cool down test			Overnight soak	Rapid cool down test			Overnight soak	Rapid cool down test		
		1	2	3		1	2	3		1	2	3		1	2	3		1	2	3
HOOD UP - COLD START AT 20° F AMBIENT																				
0	No test	18	18	18	-	1/	20	21	-	26	22	25	-	18	1/	1/	-	19	19	21
8.4		21	21	20	-		150	146	-	101	104	105	-	72			-	69	65	64
22.9		24	24	22	-		169	168	-	130	144	145	-	76			-	82	82	81
HOOD UP - HOT START AT 20° F AMBIENT FOLLOWING 10-MINUTE SOAK																				
0	No test	20	22	21	-	165	189	188	-	114	132	133	-	76	1/	1/	-	101	102	101
8.4		24	24	22	-	168	176	177	-	146	162	166	-	70			-	80	81	75
HOOD DOWN - COLD START AT 20° F AMBIENT																				
0	18	17	18	18	20	20	21	20	20	23	23	23	20	18	1/	1/	20	18	22	20
8.4	23	22	24	22	148	134	140	139	106	97	104	91	82	72			64	61	65	58
22.9	24	24	25	24	176	160	160	160	156	146	147	148	80	78			86	80	80	78
HOOD DOWN - HOT START AT 20° F FOLLOWING 10-MINUTE SOAK																				
0	22	22	23	21	205	186	185	184	142	132	134	132	89	82	1/	1/	106	104	104	103
8.4	26	24	26	24	174	160	161	163	162	152	154	158	82	80			80	75	76	76
HOOD UP - COLD START AT 110° F AMBIENT																				
0	No test	109	106	106	-	109	109	109	-	112	112	112	-	1/	106	108	-	106	106	108
8.4		110	110	108	-	202	202	202	-	182	188	187	-		121	120	-	115	116	115
22.9		110	110	106	-	207	204	205	-	215	205	209	-		124	122	-	124	122	123
HOOD UP - HOT START AT 110° F FOLLOWING 10-MINUTE SOAK																				
0	No test	109	110	111	-	229	226	227	-	193	190	194	-	1/	136	136	-	147	145	145
8.4		110	110	108	-	207	206	206	-	227	224	221	-		126	122	-	124	125	125
HOOD DOWN - COLD START AT 110° F AMBIENT																				
0	106	108	102	107	108	109	106	110	96	114	109	114	1/	1/	104	109	108	107	104	108
8.4	108	111	110	109	202	202	202	201	175	189	175	179			123	125	118	123	117	119
22.9	111	110	110	112	207	206	206	205	216	212	211	212			135	131	134	133	132	137
HOOD DOWN - COLD START AT 110° F FOLLOWING 10-MINUTE SOAK																				
0	110	111	112	111	232	232	230	230	197	198	197	198	1/	1/	146	146	156	153	154	155
8.4	111	111	110	110	206	205	205	205	222	220	218	217			130	132	132	132	132	132

1/ Thermocouple failure.

NOTE.--Thermocouple locations: Air to vehicle--ahead of radiator near source; coolant--in or close to engine block; oil--in oil drain plug; air to carburetor--in air at center of air filter or following air filter; under hood--in air space under carburetor.

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TABLE A-8. - Hood up--hood down emissions comparisons

(Car No. 43, Ford catalyst equipped)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test			Hot transient, grams/test			1975 CVS weighted, grams/mile		
		CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x	CO	HC	NO_x
20° F AMBIENT - RAPID COOL DOWN 1/													
4896	Up	671.8	20.09	7.61	2.85	0.90	10.76	14.28	0.99	9.73	40.00	1.35	2.61
4898	Up	570.3	15.51	7.42	2.80	1.04	10.71	8.92	1.12	10.92	33.80	1.11	2.68
4900	Up	622.8	20.27	8.37	2.90	1.15	11.55	9.93	1.11	11.22	36.90	1.40	2.87
Average	Up	621.6	18.62	7.80	2.85	1.03	11.01	11.04	1.07	10.62	36.90	1.29	2.72
4897	Down	596.3	14.26	8.11	2.84	1.16	10.38	11.85	1.36	10.08	35.50	1.08	2.62
4899	Down	653.3	20.82	8.10	2.81	1.18	11.29	8.48	1.18	11.57	38.50	1.44	2.85
4901	Down	611.5	19.58	8.26	2.82	1.12	11.59	12.90	1.11	11.75	36.40	1.36	2.91
Average	Down	620.4	18.22	8.16	2.82	1.15	11.09	11.08	1.22	11.13	36.80	1.29	2.79
Difference Down-Up:													
Grams..........		- 1.2	-0.40	0.36	-0.03	0.12	0.08	0.04	0.15	0.51	0.10	0.00	0.07
Percent........		0	-2	5	-1	12	1	0	14	5	0	0	3
50° F AMBIENT - RAPID COOL DOWN 2/													
4890	Up	314.9	5.96	6.64	4.23	0.84	10.18	10.09	1.08	8.70	19.40	0.54	2.40
4894	Up	391.1	11.88	6.73	2.11	.91	10.04	8.38	1.25	10.05	23.30	.90	2.49
Average	Up	353.0	8.92	6.69	3.17	.88	10.11	9.24	1.17	9.38	21.35	.72	2.45
4891	Down	275.8	4.90	6.73	2.78	0.80	9.59	16.58	2.32	9.46	17.40	0.56	2.38
4893	Down	378.8	11.15	7.93	2.15	.78	10.35	10.92	1.87	5.59	22.80	.89	2.26
Average	Down	327.3	8.03	7.33	2.47	.79	9.97	13.75	2.10	7.53	20.10	.73	2.32
Difference Down-Up:													
Grams..........		-25.7	-0.89	0.64	-0.70	-0.09	-0.14	4.51	0.93	-1.85	-1.25	0.01	-0.13
Percent........		- 7	-10	10	-22	-10	-1	49	79	-20	-6	1	-5
110° F AMBIENT - RAPID COOL DOWN 1/													
4903	Up	41.7	2.04	9.77	4.16	0.75	13.32	57.60	1.49	7.88	7.32	0.33	2.94
4905	Up	34.8	1.79	10.15	4.18	1.03	13.49	46.02	1.68	8.85	6.05	.37	3.05
4907	Up	28.5	1.57	9.76	5.65	1.05	13.33	38.94	1.73	9.93	5.35	.36	3.09
Average	Up	35.0	1.80	9.89	4.66	.94	13.38	47.52	1.63	8.89	6.24	.35	3.03
4904	Down	40.5	1.39	10.18	7.05	0.63	12.28	83.60	3.60	7.98	9.61	0.44	2.83
4906	Down	33.8	1.59	11.02	6.23	1.03	14.09	60.05	3.55	9.52	7.33	.50	3.23
4908	Down	29.6	1.51	9.85	5.67	1.12	13.74	45.49	4.14	10.39	5.91	.55	3.19
Average	Down	34.6	1.50	10.35	6.32	.93	13.37	63.05	3.76	9.30	7.62	.50	3.08
Difference Down-Up:													
Grams..........		- 0.4	-0.30	0.46	1.66	-0.01	-0.01	15.53	2.13	0.41	1.38	0.15	0.05
Percent........		- 1	-17	5	36	-1	0	33	131	5	22	43	2

1/ Three replicates in one day.

2/ One pair tests per day.

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

NOTE.-NO_x not corrected to air moisture content of 75 grains.

NOTE.-Accelerated cool down to same coolant and air temperature and repeat for each test.

BERC-EPA Temperature Effects Project--
Ambient Temperature Versus Emissions

TABLE A-9. - Hood up constant airstream versus hood-down variable airstream

(Car No. 39, 1972 Ford)

Test No.	Hood position	Cold transient, grams/test			Stabilized, grams/test		
		CO	HC	NO_x	CO	HC	NO_x
20° F AMBIENT							
4749	Up	930.09	51.61	13.91	434.71	17.50	17.74
4750	Up	943.27	48.73	14.68	455.91	18.76	18.55
4753	Up	966.40	47.54	14.62	409.89	17.70	18.58
Average	Up	946.59	49.29	14.40	433.50	17.99	18.29
4747	Down	881.80	45.20	13.97	427.68	16.92	18.34
4748	Down	826.64	45.07	12.63	471.75	18.51	18.87
4752	Down	933.86	48.24	15.90	404.63	17.22	18.44
Average	Down	880.77	46.17	14.17	434.69	17.55	18.55
Difference Down-Up:							
Grams..........		-65.82	-3.12	-0.23	0.85	-0.44	0.26
Percent........		- 7	-6	-2	0	-2	1
110° F AMBIENT							
4757	Up	222.63	11.87	21.94	385.16	14.50	17.93
4754	Up	240.86	15.29	21.38	413.87	15.56	17.11
Average	Up	231.75	13.58	21.66	399.52	15.03	17.52
4755	Down	244.82	13.04	19.90	427.20	15.88	16.37
4756	Down	238.61	12.46	19.46	396.72	14.86	16.76
Average	Down	241.72	12.75	19.68	411.96	15.37	16.57
Difference Down-Up:							
Grams..........		9.97	-0.83	-1.98	12.44	0.34	-0.95
Percent........		4	-6	-9	3	2	-5

NOTE.-Any percent difference whose absolute value is less than 0.5 is called "0" (zero).

NOTE.-NO_x not corrected to air moisture content of 75 grains.

NOTE.-Accelerated cool down to same coolant and air temperature and repeat for each test.

APPENDIX B (25 pages)

Hydrocarbon emissions by vehicle

Duplicate test emissions averaged for 20°, 50°, 75°, 110°, and 110° F with air for each of 26 vehicles and at each test phase of the 1975 CVS Federal test driving cycle.

Table B-1 -- weighted composite
B-2 -- cold transient phase
B-3 -- stabilized phase
B-4 -- hot transient phase

TABLE B-1. - Effect of ambient temperature on hydrocarbon emission over 1975 CVS composite

Vehicle description			HC, grams per mile				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	11.37	8.47	6.13	5.90	
	Chevrolet	53	11.92	10.04	9.53	9.15	
	Plymouth	59	15.23	13.33	9.87	8.66	
1969	Ford	54	9.26	6.16	6.21	7.10	
	Chevrolet	57	7.33	6.51	4.81	4.67	4.96
	AMC	58	8.90	6.61	4.85	5.03	
	Mercury	62	10.33	4.62	4.54	4.26	4.61
1970	Chrysler	55	5.39	4.50	4.55	5.03	6.31
	Oldsmobile	60	4.63	3.99	3.85	3.56	4.10
1971	Ford	50	7.33	5.66	3.92	3.68	
	Chevrolet	51	5.37	4.48	2.82	3.00	3.74
	Chevrolet	52	7.00	5.05	3.45	4.13	4.56
	Buick	61	4.22	4.66	4.97	3.30	4.12
	Dodge	63	4.72	4.04	3.89	4.12	4.62
1972	Ford	39	5.99		4.31	4.46	4.77
1973	Mazda	38	6.19		2.87	2.74	3.83
	Volvo	40	6.87		4.32	4.59	4.43
	Ford	41	5.81		3.07	3.62	4.24
	Chevrolet	42	4.65		3.42	4.26	5.01
1974	Ford	45	6.27		1.92	2.08	
PROTOTYPE							
	Ford	43	1.28	.34	.53	.53	.54
	Chevrolet	46	1.15	.31	.57	.52	.58
	Plymouth	48	1.98	1.18	.65	.53	.60
	Ford	56	.84	.41	.22	.36	.44
DIESEL							
	Opel	44	.60	.30	.49	.40	
PROCO							
	Ford	47	.55	.28	.20	.14	

TABLE B-2. - Effect of ambient temperature on hydrocarbon emission over cold transient phase

Vehicle description			HC, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	112.7	65.3	27.8	22.4	
	Chevrolet	53	75.9	53.8	41.8	34.0	
	Plymouth	59	151.4	130.7	73.6	40.7	
1969	Ford	54	67.1	30.2	23.9	22.3	
	Chevrolet	57	55.9	46.8	24.8	16.2	17.7
	AMC	58	85.5	49.4	24.2	19.5	
	Mercury	32	124.4	36.0	27.9	17.5	15.3
1970	Chrysler	55	37.4	24.5	19.9	19.7	26.2
	Oldsmobile	60	28.3	21.2	19.0	13.2	14.9
1971	Ford	50	78.8	48.9	22.0	14.4	
	Chevrolet	51	50.3	37.2	14.6	10.5	15.9
	Chevrolet	52	68.9	39.3	13.7	12.8	16.8
	Buick	61	26.7	29.6	16.2	10.3	12.5
	Dodge	63	33.1	24.0	19.6	16.1	16.6
1972	Ford	39	49.2		21.3	13.9	13.8
1973	Mazda	38	82.9		16.9	12.9	14.6
	Volvo	40	33.5		18.2	16.4	15.9
	Ford	41	50.4		14.9	11.6	14.7
	Chevrolet	42	38.6		16.9	17.0	19.8
1974	Ford	45	89.5		10.5	8.8	
PROTOTYPE							
	Ford	43	17.8	7.2	2.3	2.8	2.6
	Chevrolet	46	16.6	10.3	6.8	4.6	4.9
	Plymouth	48	27.3	15.3	7.6	5.5	3.8
	Ford	56	13.0	5.1	2.0	1.6	2.6
DIESEL							
	Opel	44	6.5	2.2	2.3	1.9	
PROCO							
	Ford	47	7.8	3.4	2.1	1.5	

TABLE B-3. - Effect of ambient temperature on hydrocarbon emission over stabilized phase

Vehicle description			HC, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	26.4	25.0	23.6	23.8	
	Chevrolet	53	39.3	35.0	35.4	35.1	
	Plymouth	59	35.0	30.9	30.2	33.1	
1969	Ford	54	29.4	22.7	25.6	31.2	
	Chevrolet	57	21.7	19.4	17.0	17.3	19.4
	AMC	58	20.5	18.9	17.1	19.1	
	Mercury	62	17.3	13.2	15.1	16.3	18.6
1970	Chrysler	55	16.5	15.9	17.1	18.6	23.6
	Oldsmobile	60	15.6	14.3	13.9	12.5	14.7
1971	Ford	50	14.7	14.6	13.1	13.0	
	Chevrolet	51	12.3	11.7	10.1	11.9	13.5
	Chevrolet	52	16.8	15.5	14.5	17.6	18.4
	Buick	61	14.0	15.7	20.9	11.0	17.2
	Dodge	63	14.5	13.4	13.6	15.9	18.4
1972	Ford	39	16.4		14.9	16.6	18.2
1973	Mazda	38	4.1		6.1	5.2	8.4
	Volvo	40	26.3		16.5	18.3	15.3
	Ford	41	15.4		11.8	13.9	16.4
	Chevrolet	42	11.7		12.0	14.6	17.7
1974	Ford	45	6.0		6.7	7.8	
PROTOTYPE							
	Ford	43	1.1	1.0	1.1	1.2	1.1
	Chevrolet	46	.9	1.0	.7	1.1	1.1
	Plymouth	48	2.1	1.5	.9	.8	1.5
	Ford	56	.3	.3	.3	.4	.4
DIESEL							
	Opel	44	.9	.9	2.0	.8	
PROCO							
	Ford	47	.4	.3	.4	.2	

TABLE B-4 - Effect of ambient temperature on hydrocarbon emission over hot transient phase

Vehicle description			HC, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	18.2	18.2	18.2	18.9	
	Chevrolet	53	30.5	30.1	31.6	33.2	
	Plymouth	59	24.8	22.6	21.5	25.2	
1969	Ford	54	19.5	18.6	18.7	21.8	
	Chevrolet	57	16.2	16.3	14.7	18.9	
	AMC	58	16.7	16.6	15.6	18.1	17.8
	Mercury	62	11.8	10.5	12.1	14.2	
1970	Chrysler	55	13.7	12.7	14.3	18.7	16.6
	Oldsmobile	60	12.3	11.4	12.0	14.9	21.9
1971	Ford	50	11.3	11.9	12.1	14.8	16.9
	Chevrolet	51	11.1	10.5	8.3	10.7	13.5
	Chevrolet	52	10.7	9.6	9.7	13.8	15.2
	Buick	61	11.0	11.5	16.4	14.4	14.6
	Dodge	63	11.7	11.5	12.5	14.2	16.0
1972	Ford	39	12.9		14.4	19.2	20.4
1973	Mazda	38	11.7		14.4	17.1	24.6
	Volvo	40	18.9		14.1	15.9	19.5
	Ford	41	11.4		8.6	14.5	16.0
	Chevrolet	42	11.6		11.2	17.5	20.0
1974	Ford	45	4.5		5.7	7.0	
PROTOTYPE							
	Ford	43	1.5	3.8	3.3	3.5	3.3
	Chevrolet	46	1.0	1.1	1.1	1.5	2.0
	Plymouth	48	1.8	1.4	1.2	1.5	2.5
	Ford	56	.7	.9	.9	2.9	3.2
DIESEL							
	Opel	44	1.3	.7	1.4	2.4	
PROCO							
	Ford	47	.7	.5	.3	.4	

Carbon monoxide emissions by vehicle

Duplicate test emissions averaged for 20°, 50°, 75°, 110°, and 110° F with air for each of 26 vehicles and at each test phase of the 1975 CVS Federal test driving cycle.

Table B-5-- weighted composite
B-6-- cold transient phase
B-7-- stabilized phase
B-8-- hot transient phase

TABLE B-5 - Effect of ambient temperature on carbon monoxide emission over 1975 CVS composite

Vehicle description			CO, grams per mile				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	140.3	110.2	87.0	78.7	
	Chevrolet	53	124.1	114.4	112.5	111.2	
	Plymouth	59	146.3	164.5	153.6	180.8	
1969	Ford	54	68.0	42.5	35.0	35.5	
	Chevrolet	57	87.8	79.8	59.5	50.2	36.6
	AMC	58	82.0	63.7	38.0	48.6	
	Mercury	62	82.8	49.4	48.4	32.5	36.6
1970	Chrysler	55	47.3	44.3	45.9	81.3	107.2
	Oldsmobile	60	70.0	53.4	49.9	42.3	59.0
1971	Ford	50	92.5	75.1	31.2	24.2	
	Chevrolet	51	63.3	46.3	29.2	32.8	48.1
	Chevrolet	52	107.5	72.8	39.3	64.9	59.5
	Buick	61	37.8	36.9	34.5	59.9	69.6
	Dodge	63	45.4	36.6	34.3	43.3	70.3
1972	Ford	39	124.3		87.0	106.1	114.0
1973	Mazda	38	16.8		19.2	24.6	38.6
	Volvo	40	60.3		29.0	38.3	48.0
	Ford	41	78.7		48.7	69.0	84.1
	Chevrolet	42	84.6		69.4	104.7	137.7
1974	Ford	45	72.7		24.0	39.3	
PROTOTYPE							
	Ford	43	39.3	20.0	4.5	8.1	8.2
	Chevrolet	46	14.9	7.4	2.9	1.8	3.6
	Plymouth	48	27.6	16.8	5.4	3.7	9.5
	Ford	56	30.0	18.8	9.2	10.9	26.1
DIESEL							
	Opel	44	1.9	1.4	1.4	1.2	
PROCO							
	Ford	47	1.8	.6	.7	.4	

TABLE B-6. - Effect of ambient temperature on carbon monoxide emission over cold transient phase

Vehicle description			CO, grams per test				
			Test temperature, °F				
Model year	Manufacturer	Code	20	50	75	110	110 /[illegible]
STANDARD PRODUCTION							
[illegible]	Ford	[illegible]	1251.2	[illegible]	[illegible]	[illegible]	
	Chevrolet	[illegible]	[illegible]	[illegible]	420.2	[illegible]	
	Plymouth	[illegible]	1252.1	1147.7	[illegible]	[illegible]	
[illegible]	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Chevrolet	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Mercury	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
1970	Chrysler	55	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Oldsmobile	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1971	Ford	[illegible]	1111.7	[illegible]	[illegible]	[illegible]	[illegible]
	Chevrolet	51	[illegible]	[illegible]	[illegible]	[illegible]	
	Chevrolet	52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Buick	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Dodge	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1972	Ford	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	Honda	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
	Volvo	[illegible]	[illegible]		142.1	[illegible]	[illegible]
	Ford	[illegible]	555.0		[illegible]	[illegible]	[illegible]
	Chevrolet	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	Ford	[illegible]	1059.0		[illegible]	119.0	[illegible]
PROTOTYPE							
	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Chevrolet	[illegible]	[illegible]	117.2	[illegible]	10.1	[illegible]
	Plymouth	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
DIESEL							
	Opel	[illegible]	11.5	[illegible]	[illegible]	[illegible]	
[illegible]							
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

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TABLE B-7. - Effect of ambient temperature on carbon monoxide emission over stabilized phase

Vehicle description			CO, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	392.4	342.6	354.9	355.3	
	Chevrolet	53	453.2	441.3	464.5	455.3	
	Plymouth	59	385.3	502.7	515.1	683.6	
1969	Ford	54	151.9	87.0	126.3	120.4	
	Chevrolet	57	260.2	243.0	136.0	185.3	244.0
	AMC	58	151.8	156.8	94.7	171.7	
	Mercury	62	50.7	71.5	100.5	129.4	154.5
1970	Chrysler	55	110.9	120.9	145.6	288.3	398.2
	Oldsmobile	60	228.0	174.6	164.6	163.9	212.4
1971	Ford	50	165.7	150.6	47.3	73.4	
	Chevrolet	51	79.5	64.7	66.2	125.1	171.7
	Chevrolet	52	213.3	166.5	157.2	288.2	[illegible]2.6
	Buick	61	78.0	97.8	110.3	230.1	253.9
	Dodge	63	97.2	72.8	71.1	147.4	227.0
1972	Ford	39	400.8		363.8	481.3	503.6
1973	Mazda	38	25.0		46.7	66.1	121.9
	Volvo	40	217.6		102.4	173.3	198.9
	Ford	41	263.8		181.3	284.4	339.9
	Chevrolet	42	180.4		214.2	363.6	472.0
1974	Ford	45	52.8		43.5	209.0	
PROTOTYPE							
	Ford	43	2.8	3.5	2.8	4.9	8.0
	Chevrolet	46	.7	.5	.5	.7	1.1
	Plymouth	48	2.3	2.2	2.4	4.2	23.1
	Ford	56	12.2	16.4	12.9	20.6	79.9
DIESEL							
	Opel	44	6.4	5.6	5.8	4.2	
PROCO							
	Ford	47	.7	.5	.9	.6	

B-8. - [illegible] temperature on carbon [illegible] over hot transient [illegible]

[illegible]

Oxides of nitrogen emissions

Duplicate test emissions averaged for 20°, 50°, 75°, 110°, and 110° F with air for each of 26 vehicles and at each test phase of the 1975 CVS Federal test driving cycle.

Table B-9 --weighted composite
B-10--cold transient phase
B-11--stabilized phase
B-12--hot transient phase

TABLE B-9. - Effect of ambient temperature on nitrogen oxide emission over 1975 CVS composite

Vehicle description			NOx, grams per mile				
			Test temperature, °F				
Model year	Manufacturer	Code	20	50	75	110	110 1/
STANDARD PRODUCTION							
1967	Ford	[illegible]	[illegible].65	7.01	[illegible].70	[illegible]	
	Chevrolet	[illegible]	5.08	4.46	3.02	[illegible]	
	Plymouth	53	5.02	[illegible].52	2.05	[illegible]	
1969	Ford	54	10.12	8.92	8.60	[illegible]	
	Chevrolet	57	7.34	6.58	5.55	[illegible]	[illegible]
	AMC	58	[illegible].64	7.25	7.30	[illegible].72	
	Mercury	52	13.04	10.79	8.01	[illegible]1	11.[illegible]
1970	Chrysler	55	9.00	9.01	7.44	[illegible]	[illegible]
	Oldsmobile	60	4.26	4.52	5.56	[illegible]	5.[illegible]
1971	Ford	50	7.07	8.26	7.14	[illegible]	
	Chevrolet	51	6.64	5.72	5.00	5.07	6.[illegible]
	Chevrolet	52	[illegible].42	9.00	7.41	[illegible]1	11.1[illegible]
	Buick	[illegible]1	6.17	5.02	5.50	[illegible]	[illegible]
	Dodge	[illegible]	9.07	8.50	6.55	[illegible].52	[illegible]
1972	Ford	[illegible]	4.34		4.45	[illegible]	[illegible]
1973	Mazda	38	2.01		1.25	.57	1.[illegible]
	Volvo	40	3.74		2.99	[illegible].28	[illegible].21
	Ford	41	[illegible].88		2.02	2.10	[illegible]
	Chevrolet	42	2.20		1.59	1.[illegible]	1.[illegible]
1974	Ford	45	3.37		2.34	3.05	
PROTOTYPE							
	Ford	[illegible]	2.75	2.70	2.25	2.22	[illegible]
	Chevrolet	[illegible]	3.05	3.26	3.10	[illegible]	[illegible]
	Plymouth	48	5.04	4.50	2.65	2.44	[illegible]
	Ford	[illegible]	1.75	1.55	1.35	1.20	1.11
DIESEL							
	Opel	44	2.00	1.09	1.7[illegible]	1.35	
PROCO							
	Ford	[illegible]	1.37	1.25	1.05	1.[illegible]	

TABLE B-10.- Effect of ambient temperature on nitrogen oxide emission over cold transient phase

Vehicle description			NOx, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	14.67	18.95	25.10	31.26	
	Chevrolet	53	21.13	20.14	17.67	14.48	
	Plymouth	59	11.09	9.49	7.73	9.94	
1969	Ford	54	23.34	23.99	28.66	30.69	
	Chevrolet	57	29.95	23.13	21.22	27.63	30.47
	AMC	58	23.26	23.52	26.35	31.47	
	Mercury	62	29.54	31.90	27.75	37.17	50.12
1970	Chrysler	55	31.36	31.43	26.94	13.91	25.57
	Oldsmobile	60	19.04	18.12	13.97	17.16	23.32
1971	Ford	50	17.40	21.79	24.22	31.94	
	Chevrolet	51	20.32	21.72	19.77	20.62	24.52
	Chevrolet	52	19.18	27.24	30.31	25.68	36.46
	Buick	61	26.71	25.85	27.23	25.02	31.55
	Dodge	63	27.79	24.81	19.01	24.12	23.45
1972	Ford	39	14.04		16.69	17.15	21.11
1973	Mazda	38	9.83		5.54	2.58	7.16
	Volvo	40	16.78		14.27	13.52	19.95
	Ford	41	12.66		8.68	8.96	9.56
	Chevrolet	42	7.01		6.58	6.72	6.16
1974	Ford	45	7.93		8.38	10.99	
PROTOTYPE							
	Ford	43	6.64	8.45	7.65	7.42	9.05
	Chevrolet	46	13.24	12.46	11.54	11.26	12.68
	Plymouth	48	22.63	19.35	8.67	10.36	12.13
	Ford	56	8.73	9.59	10.24	9.29	8.74
DIESEL							
	Opel	44	7.46	7.57	6.48	6.73	
PROCO							
	Ford	47	6.73	3.19	4.98	4.71	

TABLE B-11. - Effect of ambient temperature on nitrogen oxide emission over stabilized phase

			NOx, grams per test				
[illegible]			Test temperature, F				
[illegible]	[illegible]	Code	20	50	75	110	[illegible]
[illegible]							
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Chevrolet	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Plymouth	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Chevrolet	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1970	[illegible]	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Oldsmobile	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1971	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	Chevrolet	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Chevrolet	[illegible]	[illegible]	[illegible]	[illegible]	12.72	[illegible]
	Buick	1	[illegible]	[illegible]	15.10	[illegible]	[illegible]
	Dodge	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1972	Ford	[illegible]	[illegible]		[illegible]	[illegible]	15.02
[illegible]	Honda	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
	Volvo	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
	Ford	11	[illegible]		7.10	[illegible]	[illegible]
	Chevrolet	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	Ford	[illegible]	13.55		[illegible]	12.56	
[illegible]							
	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Chevrolet	[illegible]	[illegible]	[illegible]	11.55	[illegible]	[illegible]
	Plymouth	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]							
	Opel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]							
	Ford	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

TABLE B-12.- Effect of ambient temperature on nitrogen oxide emission over hot transient phase

Vehicle description			NOx, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	34.39	36.65	33.70	27.41	
	Chevrolet	53	22.05	18.10	15.36	12.21	
	Plymouth	59	24.96	15.35	13.11	9.44	
1969	Ford	54	43.36	38.08	31.66	30.74	
	Chevrolet	57	34.29	27.50	24.54	22.80	26.89
	AMC	58	38.77	30.78	32.39	23.23	
	Mercury	62	55.03	49.32	39.93	39.33	46.74
1970	Chrysler	55	42.52	39.11	28.95	19.89	25.14
	Oldsmobile	60	18.79	19.04	14.83	15.69	21.47
1971	Ford	50	35.13	36.49	28.60	30.52	
	Chevrolet	51	29.37	25.43	20.48	21.86	25.64
	Chevrolet	52	40.22	37.01	30.22	23.81	38.31
	Buick	61	29.34	27.37	25.39	22.45	26.39
	Dodge	63	36.98	34.91	25.25	24.28	22.95
1972	Ford	39	22.06		19.42	15.57	19.24
1973	Mazda	38	8.17		6.06	2.51	6.28
	Volvo	40	14.94		11.74	12.96	16.96
	Ford	41	16.04		8.40	8.16	9.03
	Chevrolet	42	9.40		5.88	4.78	4.25
1974	Ford	45	14.96		8.93	9.90	
PROTOTYPE							
	Ford	43	10.74	9.81	7.45	5.95	8.66
	Chevrolet	46	13.19	12.90	11.80	13.62	16.52
	Plymouth	48	14.72	15.89	12.35	9.08	8.68
	Ford	56	5.98	5.98	4.77	4.11	4.15
DIESEL							
	Opel	44	6.78	6.44	5.72	6.25	
PROCO							
	Ford	47	5.19	4.71	4.24	4.47	

Total aldehyde emissions

Duplicate test emissions averaged for 20°, 50°, 75°, 110°, and 110° F with air for each of 26 vehicles and at each test phase of the 1975 CVS Federal test driving cycle.

Table B-13 -- weighted composite
B-14 -- cold transient phase
B-15 -- stabilized phase
B-16 -- hot transient phase

TABLE B-13.- Effect of ambient temperature on aldehyde emission over 1975 CVS composite

Vehicle description			RCHO, grams per mile				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	.20	.18	.16	.14	
	Chevrolet	53					
	Plymouth	59					
1969	Ford	54	.32	.29	.25	.30	
	Chevrolet	57					
	AMC	58	.26	.21	.23	.20	
	Mercury	62	.29	.24	.19	.17	.19
1970	Chrysler	55					
	Oldsmobile	60					
1971	Ford	50					
	Chevrolet	51					
	Chevrolet	52	.17	.15	.13	.13	.15
	Buick	61	.13	.15	.14	.09	.13
	Dodge	63					
1972	Ford	39					
1973	Mazda	38	.15		.06	.06	.09
	Volvo	40					
	Ford	41					
	Chevrolet	42					
1974	Ford	45					
PROTOTYPE							
	Ford	43	.04	.05	.06	.03	.01
	Chevrolet	46	.03	.03	.03	.02	
	Plymouth	48	.06	.05	.03	.02	.01
	Ford	56	.01	.01	.00	.01	.00
DIESEL							
	Opel	44	.05	.04	.05	.05	
PROCO							
	Ford	47	.04	.03	.01	.01	

TABLE B-14. - Effect of ambient temperature on aldehyde emission over cold transient phase

Vehicle description			RCHO, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	.83	.67	.62	.53	
	Chevrolet	53					
	Plymouth	59					
1969	Ford	54	.82	.70	.73	.95	
	Chevrolet	57					
	AMC	58	.97	.73	.68	.73	
	Mercury	62	.96	.72	.61	.66	.76
1970	Chrysler	55					
	Oldsmobile	60					
1971	Ford	50					
	Chevrolet	51					
	Chevrolet	52	.82	.52	.48	.45	.54
	Buick	61	.46	.57	.37	.36	.36
	Dodge	63					
1972	Ford	39					
1973	Mazda	38	1.25		.27	.44	.52
	Volvo	40					
	Ford	41					
	Chevrolet	42					
1974	Ford	45					
PROTOTYPE							
	Ford	43	.22	.19	.16	.15	.06
	Chevrolet	46	.22	.18	.20	.23	
	Plymouth	48	.51	.33	.24	.15	.13
	Ford	56	.12	.07	.03	.07	.04
DIESEL							
	Opel	44	.38	.16	.19	.18	
PROCO							
	Ford	47	.36	.35	.14	.12	

TABLE B-15. - Effect of ambient temperature on aldehyde emission over stabilized phase

Vehicle description			RCHO, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	.83	.71	.64	.60	
	Chevrolet	53					
	Plymouth	59					
1969	Ford	54	1.44	1.25	1.09	1.34	
	Chevrolet	57					
	AMC	58	1.04	.86	1.00	.85	
	Mercury	62	1.27	1.02	.79	.70	.79
1970	Chrysler	55					
	Oldsmobile	60					
1971	Ford	50					
	Chevrolet	51					
	Chevrolet	52	.63	.63	.56	.55	.70
	Buick	61	.52	.62	.60	.38	.61
	Dodge	63					
1972	Ford	39					
1973	Mazda	38	.37		.16	.18	.25
	Volvo	40					
	Ford	41					
	Chevrolet	42					
1974	Ford	45					
PROTOTYPE							
	Ford	43	.15	.19	.24	.14	.06
	Chevrolet	46	.11	.09	.10	.05	
	Plymouth	48	.18	.16	.10	.06	.03
	Ford	56	.00	.00	.01	.01	.00
DIESEL							
	Opel	44	.16	.15	.22	.18	
PROCO							
	Ford	47	.06	.04	.01	.01	

TABLE B-16.- Effect of ambient temperature on aldehyde emission over hot transient phase

Vehicle description			RCHO, grams per test				
Model year	Manu-facturer	Code	Test temperature, F				
			20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	.55	.60	.59	.45	
	Chevrolet	53					
	Plymouth	59					
1969	Ford	54	1.06	1.13	.85	.87	
	Chevrolet	57					
	AMC	58	.82	.72	.74	.58	
	Mercury	62	.89	.89	.69	.56	.58
1970	Chrysler	55					
	Oldsmobile	60					
1971	Ford	50					
	Chevrolet	51					
	Chevrolet	52	.55	.54	.42	.35	.36
	Buick	61	.39	.45	.49	.27	.31
	Dodge	63					
1972	Ford	39					
1973	Mazda	38	.37		.31	.21	.35
	Volvo	40					
	Ford	41					
	Chevrolet	42					
1974	Ford	45					
PROTOTYPE							
	Ford	43	.11	.16	.19	.08	.04
	Chevrolet	46	.10	.09	.08	.04	
	Plymouth	48	.11	.13	.10	.04	.03
	Ford	56	.01	.01	.01	.02	.01
DIESEL							
	Opel	44	.14	.11	.14	.23	
PROCO							
	Ford	47	.11	.07	.02	.03	

Fuel consumption

Fuel consumption averaged for duplicate tests at test ambients of 20°, 50°, 75°, 110°, and 110° F with air for each of 26 vehicles and each phase of the 1975 CVS driving cycle.

Table B-17 -- weighted composite
B-18 -- cold transient phase
B-19 -- stabilized phase
B-20 -- hot transient phase

TABLE B-17. – Effect of ambient temperature on fuel economy over 1975 CVS composite

Vehicle description			Fuel economy, miles per gallon				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	10.4	11.1	11.8	11.9	
	Chevrolet	53	11.0	12.0	12.2	12.4	
	Plymouth	59	10.7	10.8	11.3	10.9	
1969	Ford	54	10.7	11.9	12.1	11.2	
	Chevrolet	57	11.3	11.9	12.4	13.1	11.5
	AMC	58	11.4	12.4	12.7	12.7	
	Mercury	62	9.1	10.0	11.0	11.3	10.2
1970	Chrysler	55	10.4	10.9	11.0	11.3	9.7
	Oldsmobile	60	9.8	10.4	10.9	11.8	10.1
1971	Ford	50	9.6	10.0	10.8	11.5	
	Chevrolet	51	9.9	10.8	11.2	11.7	10.0
	Chevrolet	52	9.7	10.2	11.1	10.8	9.2
	Buick	61	8.6	8.9	8.9	9.4	8.8
	Dodge	63	11.2	12.3	12.6	12.3	10.9
1972	Ford	39	9.5		10.3	10.5	9.9
1973	Mazda	38	11.5		11.5	11.7	10.7
	Volvo	40	14.0		16.0	16.1	14.2
	Ford	41	9.6		9.5	10.0	9.4
	Chevrolet	42	10.4		11.1	10.6	9.8
1974	Ford	45	7.3		8.5	8.0	
PROTOTYPE							
	Ford	43	8.2	8.7	9.6	9.8	9.1
	Chevrolet	46	9.4	9.7	9.7	10.2	9.5
	Plymouth	48	8.7	9.9	10.6	11.4	10.0
	Ford	56	12.0	12.8	13.2	14.0	12.2
DIESEL							
	Opel	44	17.1	18.6	19.7	20.1	
PROCO							
	Ford	47	19.3	20.4	21.2	20.5	

TABLE B-18.- Effect of ambient temperature on fuel consumed over cold transient phase

Vehicle description			Fuel, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	1433.9	1193.8	947.6	815.4	
	Chevrolet	53	1125.3	961.7	869.4	804.2	
	Plymouth	59	1337.3	1214.2	1060.1	994.9	
1969	Ford	54	1226.5	974.1	873.5	845.3	
	Chevrolet	57	1130.8	985.7	898.1	770.9	854.0
	AMC	58	1268.6	990.0	871.1	772.3	
	Mercury	62	1626.2	1234.6	1077.3	867.6	949.6
1970	Chrysler	55	1136.1	1026.8	957.5	880.8	1033.5
	Oldsmobile	60	1269.9	1110.9	1015.1	855.6	959.3
1971	Ford	50	1462.9	1312.8	1030.6	850.5	
	Chevrolet	51	1318.0	1132.8	970.7	854.7	966.0
	Chevrolet	52	1466.0	1232.2	935.4	852.5	1006.7
	Buick	61	1410.0	1249.2	1225.4	1058.5	1225.3
	Dodge	63	1104.4	945.3	873.0	821.8	922.3
1972	Ford	39	1331.2		1003.4	916.0	949.5
1973	Mazda	38	936.2		854.2	773.9	854.9
	Volvo	40	780.2		616.2	582.1	633.8
	Ford	41	1279.1		1109.9	994.1	1075.2
	Chevrolet	42	1235.1		975.0	931.2	1023.4
1974	Ford	45	1821.0		1245.8	1109.0	
PROTOTYPE							
	Ford	43	1573.9	1358.8	1071.9	1004.3	1110.9
	Chevrolet	46	1202.3	1051.3	1056.3	935.7	1022.5
	Plymouth	48	1343.2	1074.0	1045.4	934.4	996.5
	Ford	56	1042.3	903.6	789.7	702.2	764.9
DIESEL							
	Opel	44	742.0	621.5	587.8	534.1	
PROCO							
	Ford	47	556.7	479.1	445.5	440.5	

TABLE B-19.- Effect of ambient temperature on fuel consumed over stabilized phase

Vehicle description			Fuel, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	958.4	954.2	939.9	978.5	
	Chevrolet	53	971.5	916.2	916.3	913.7	
	Plymouth	59	935.1	963.4	965.4	1021.1	
1969	Ford	54	975.9	893.0	922.6	1056.0	
	Chevrolet	57	934.8	913.8	883.0	852.4	976.5
	AMC	58	876.4	853.0	864.3	892.7	
	Mercury	62	1146.0	1065.2	989.5	1014.9	1127.7
1970	Chrysler	55	1040.6	1011.9	1023.6	1005.4	1173.2
	Oldsmobile	60	1099.6	1065.3	1026.3	972.0	1135.0
1971	Ford	50	1096.1	1057.3	1054.6	1006.4	
	Chevrolet	51	1095.6	1013.3	1012.1	998.0	1157.7
	Chevrolet	52	1046.4	1056.5	1030.5	1103.9	1289.1
	Buick	61	1290.7	1277.3	1290.4	1248.5	1271.9
	Dodge	63	940.8	867.5	872.9	913.4	1042.3
1972	Ford	39	1149.8		1115.8	1115.6	1179.8
1973	Mazda	38	1035.3		1054.2	1040.2	1136.9
	Volvo	40	829.1		736.4	744.7	848.7
	Ford	41	1144.2		1196.4	1161.1	1219.7
	Chevrolet	42	1015.9		1007.2	1062.1	1136.1
1974	Ford	45	1443.0		1334.8	1465.0	
PROTOTYPE							
	Ford	43	1274.6	1252.8	1189.7	1160.5	1272.4
	Chevrolet	46	1176.3	1173.7	1175.6	1146.5	1215.5
	Plymouth	48	1308.5	1156.7	1046.4	982.3	1143.1
	Ford	56	899.8	866.2	872.8	834.2	973.8
DIESEL							
	Opel	44	612.0	580.1	548.4	544.7	
PROCO							
	Ford	47	599.9	586.5	572.7	585.9	

TABLE B-20. - Effect of ambient temperature on fuel consumed over hot transient phase

Vehicle description			Fuel, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	770.2	739.0	769.4	770.4	
	Chevrolet	53	783.3	747.9	750.1	759.5	
	Plymouth	59	782.8	799.7	761.2	837.2	
1969	Ford	54	800.2	794.9	778.9	807.4	
	Chevrolet	57	780.7	747.1	732.0	733.1	855.5
	AMC	58	732.8	717.4	720.0	741.7	
	Mercury	62	831.5	864.6	809.5	825.3	926.2
1970	Chrysler	55	847.1	818.2	851.0	834.0	944.0
	Oldsmobile	60	880.0	830.1	826.7	777.5	923.3
1971	Ford	50	814.9	823.0	779.5	808.3	
	Chevrolet	51	812.4	766.9	782.7	771.6	908.6
	Chevrolet	52	844.6	816.4	816.2	824.8	979.1
	Buick	61	959.1	943.1	968.4	925.0	1042.2
	Dodge	63	800.2	753.9	724.5	770.1	869.8
1972	Ford	39	850.7		845.1	843.9	925.4
1973	Mazda	38	693.6		708.1	751.5	803.5
	Volvo	40	586.0		541.5	538.3	621.7
	Ford	41	870.3		924.5	912.9	966.9
	Chevrolet	42	839.1		809.0	908.3	992.0
1974	Ford	45	1115.0		1034.3	1109.0	
PROTOTYPE							
	Ford	43	1041.9	1016.4	958.6	951.9	938.2
	Chevrolet	46	938.1	933.0	956.1	893.7	983.9
	Plymouth	48	923.7	881.7	847.3	812.0	913.5
	Ford	56	702.8	672.7	667.6	645.2	729.7
DIESEL							
	Opel	44	521.8	491.0	465.4	474.6	
PROCO							
	Ford	47	436.5	413.5	394.8	433.1	

APPENDIX C (13 pages)

Total, non-methane, and reactive hydrocarbon emissions by vehicle

Duplicate test emissions averaged for 20°, 50°, 75°, 110° and 110° F with air for each of 12 vehicles and at each phase of the 1975 CVS Federal test driving cycle.

Total hydrocarbon for --
(Tables C1-4)
- a. weighted composite
- b. cold transient phase
- c. stabilized phase
- d. hot transient

Non-methane for --
(Tables C5-8)
- a. weighted composite
- b. cold transient phase
- c. stabilized phase
- d. hot transient phase

Reactive for --
(Tables C9-12)
- a. weighted composite
- b. cold transient phase
- c. stabilized phase
- d. hot transient phase

TABLE C-1. Effect of ambient temperature on emissions of total hydrocarbon over the 1975 CVS weighted emissions (Results are average of duplicate tests)

Total hydrocarbon, grams per mile							
Vehicle description			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	11.37	8.47	6.06	5.90	
1969	Ford	54	9.26	6.16	6.21	7.10	
	AMC	58	8.90	6.61	4.85	5.03	
	Mercury	62	10.33	4.62	4.54	4.26	4.61
1971	Chevrolet	52	7.00	5.05	3.45	4.13	4.56
	Buick	61	4.22	4.47	4.97	3.30	4.12
1973	Mazda	38 1/	6.19		3.02	2.74	3.83
PROTOTYPE							
	Ford	43 2/	1.31	.94	.53	.58	.52
	Chevrolet	46 3/	1.00	.81	.57	.52	
	Plymouth	48	1.92	1.18	.65	.53	.60
	Ford	56	.84	.41	.22	.36	.44
PROCO							
	Ford	47	.55	.28	.20	.14	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-2. Effect of ambient temperature on emissions of total hydrocarbon over the cold transient phase (Results are average of duplicate tests)

Vehicle description			Total hydrocarbon, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	112.68	65.33	27.49	22.40	
1969	Ford	54	67.12	30.20	23.93	22.29	
	AMC	58	85.51	49.37	24.20	19.52	
	Mercury	62	124.40	35.98	27.87	17.55	15.25
1971	Chevrolet	52	68.86	39.34	13.65	12.81	16.82
	Buick	61	26.68	29.55	16.19	10.79	12.61
1973	Mazda	38 1/	82.90		17.60	12.90	14.62
PROTOTYPE							
	Ford	43 2/	18.01	8.71	2.32	2.82	2.15
	Chevrolet	46 3/	14.24	10.33	6.75	4.55	
	Plymouth	48	26.32	15.32	7.63	5.47	3.77
	Ford	56	12.99	5.12	2.03	1.57	2.59
PROCO							
	Ford	47	7.85	3.37	2.07	1.50	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-3. Effect of ambient temperature on emissions of total hydrocarbon over the stabilized phase (Results are average of duplicate tests)

Vehicle description			Total hydrocarbon, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	26.43	25.02	23.35	23.81	
1969	Ford	54	29.43	22.66	25.63	31.25	
	AMC	58	20.50	18.91	17.09	19.06	
	Mercury	62	17.26	13.22	15.15	16.28	18.58
1971	Chevrolet	52	16.30	15.49	14.46	17.58	18.35
	Buick	61	13.97	15.69	20.95	11.90	17.19
1973	Mazda	38 1/	4.09		6.82	5.22	8.37
PROTOTYPE							
	Ford	43 2/	1.19	.98	1.11	1.21	.93
	Chevrolet	46 3/	.81	.99	.71	1.06	
	Plymouth	48	2.11	1.46	.89	.77	1.46
	Ford	56	.27	.33	.29	.36	.38
PROCO							
	Ford	47	.36	.34	.44	.17	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-4. Effect of ambient temperature on emissions of total hydrocarbon over the hot transient phase (Results are average of duplicate tests)

Vehicle description			Total hydrocarbon, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	18.24	18.21	18.10	18.94	
1969	Ford	54	19.53	18.58	18.66	21.76	
	AMC	58	16.66	16.59	15.63	18.08	
	Mercury	62	11.75	10.51	12.10	14.20	16.62
1971	Chevrolet	52	10.70	9.58	9.74	13.84	15.16
	Buick	61	10.96	9.01	16.40	14.38	14.56
1973	Mazda	38 1/	11.75		14.50	17.10	24.64
PROTOTYPE							
	Ford	43 2/	1.59	4.11	3.31	3.46	3.58
	Chevrolet	46 3/	.96	1.10	1.12	1.50	
	Plymouth	48	1.77	1.37	1.19	1.49	2.45
	Ford	56	.74	.94	.88	2.88	3.2[illegible]
PROCO							
	Ford	47	.72	.52	.33	.42	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-5. Effect of ambient temperature on emissions of non-methane hydrocarbon over the 1975 CVS weighted emissions (Results are average of duplicate tests)

Non-methane hydrocarbon, grams per mile							
Vehicle description			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	10.20	7.71	5.70	5.58	
1969	Ford	54	8.76	5.90	5.99	6.85	
	AMC	58	8.14	6.13	4.61	4.76	
	Mercury	62	9.31	4.26	4.24	4.04	4.40
1971	Chevrolet	52	6.21	4.46	3.20	3.80	4.25
	Buick	61	3.94	4.17	4.71	3.01	3.78
1973	Mazda	38 1/	5.97		2.82	2.54	3.47
PROTOTYPE							
	Ford	43 2/	1.02	.74	.43	.43	.41
	Chevrolet	46 3/	.86	.68	.48	.40	
	Plymouth	48	1.60	.94	.54	.43	.44
	Ford	56	.63	.26	.14	.27	.54
PROCO							
	Ford	47	.46	.22	.15	.11	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-6. Effect of ambient temperature on emissions of non-methane hydrocarbon over the cold transient phase (Results are average of duplicate tests)

Non-methane hydrocarbon, grams per test							
Vehicle description			Test temperature, F				
Model year	Manu- facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	98.70	57.27	25.50	21.45	
1969	Ford	54	61.61	28.05	22.96	21.53	
	AMC	58	75.40	44.13	22.59	18.57	
	Mercury	62	108.71	31.67	25.20	16.77	14.68
1971	Chevrolet	52	59.14	33.25	12.65	11.85	15.70
	Buick	61	23.98	26.68	14.52	9.78	11.32
1973	Mazda	38 1/	80.96		16.46	12.13	13.68
PROTOTYPE							
	Ford	43 2/	14.35	6.38	1.76	2.30	1.73
	Chevrolet	46 3/	12.86	9.47	6.29	4.21	
	Plymouth	48	21.66	12.06	6.60	4.90	3.30
	Ford	56	10.07	3.43	1.38	1.10	1.98
PROCO							
	Ford	47	7.02	3.04	1.73	1.28	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-7. Effect of ambient temperature on emissions of non-methane hydrocarbon over the stabilized phase (Results are average of duplicate tests)

Non-methane hydrocarbon, grams per test							
Vehicle description			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	24.20	23.34	21.93	22.41	
1969	Ford	54	28.43	21.95	24.75	30.25	
	AMC	58	19.58	18.01	16.37	18.03	
	Mercury	62	16.62	12.60	14.40	15.44	17.73
1971	Chevrolet	52	15.41	14.06	13.40	16.13	17.10
	Buick	61	13.30	14.91	20.07	10.74	15.87
1973	Mazda	38 1/	3.69		6.23	4.67	7.26
PROTOTYPE							
	Ford	43 2/	.80	.69	.78	.68	.55
	Chevrolet	46 3/	.49	.57	.41	.59	
	Plymouth	48	1.78	1.20	.62	.44	.87
	Ford	56	.10	.14	.11	.14	.13
PROCO							
	Ford	47	.14	.14	.24	.11	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-8. Effect of ambient temperature on emissions of non-methane hydrocarbon over the hot transient phase (Results are average of duplicate tests)

Non-methane hydrocarbon, grams per test							
Vehicle description			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	17.23	17.29	17.26	17.85	
1969	Ford	54	18.96	18.00	18.02	20.82	
	AMC	58	15.94	15.77	14.94	16.93	
	Mercury	62	11.35	10.11	11.58	13.46	15.77
1971	Chevrolet	52	10.01	8.90	9.10	12.73	14.10
	Buick	61	10.47	8.63	15.78	13.42	13.39
1973	Mazda	38 1/	10.99		13.74	16.11	22.55
PROTOTYPE							
	Ford	43 2/	1.21	3.76	2.96	2.74	3.09
	Chevrolet	46 3/	.71	.80	.80	1.06	
	Plymouth	48	1.58	1.21	.99	1.14	1.80
	Ford	56	.46	.64	.55	2.45	2.72
PROCO							
	Ford	47	.54	.37	.18	.28	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-9. Effect of ambient temperature on emissions of reactive hydrocarbon over the 1975 CVS weighted emissions (Results are average of duplicate tests)

Vehicle description			Reactive hydrocarbon, grams per mile				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	8.51	6.63	4.82	4.77	
1969	Ford	54	7.87	5.38	5.20	5.96	
	AMC	58	6.92	5.29	3.93	4.06	
	Mercury	62	7.56	3.65	3.53	3.45	3.77
1971	Chevrolet	52	4.99	3.62	2.62	2.79	3.51
	Buick	61	3.45	3.63	3.98	2.44	3.11
1973	Mazda	38 1/	5.44		2.44	2.20	2.91
PROTOTYPE							
	Ford	43 2/	.90	.63	.38	.37	.36
	Chevrolet	46 3/	.74	.60	.43	.36	
	Plymouth	48	1.40	.82	.47	.37	.39
	Ford	56	.54	.23	.11	.24	.30
PROCO							
	Ford	47	.40	.20	.13	.10	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-10.Effect of ambient temperature on emissions of reactive hydrocarbon over the cold transient phase (Results are average of duplicate tests)

Reactive hydrocarbon, grams per test							
Vehicle description			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	78.44	45.94	21.12	18.56	
1969	Ford	54	52.78	24.60	19.79	18.69	
	AMC	58	59.98	35.41	18.78	15.89	
	Mercury	62	83.16	25.17	20.06	14.40	12.50
1971	Chevrolet	52	44.11	24.17	10.24	9.57	12.81
	Buick	61	19.55	21.66	10.87	7.57	8.54
1973	Mazda	38 1/	73.68		14.21	10.51	11.83
PROTOTYPE							
	Ford	43 2/	12.71	4.97	1.50	2.00	1.53
	Chevrolet	46 3/	11.04	8.31	5.73	3.87	
	Plymouth	48	18.67	10.28	5.76	4.20	2.89
	Ford	56	8.75	2.92	1.19	.92	1.68
PROCO							
	Ford	47	6.03	2.76	1.52	1.16	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-11.Effect of ambient temperature on emissions of reactive hydrocarbon over the stabilized phase (Results are average of duplicate tests)

Vehicle description			Reactive hydrocarbon, grams per test				
			Test temperature, F				
Model year	Manufacturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	21.46	21.05	18.64	19.19	
1969	Ford	54	26.33	20.34	21.65	26.53	
	AMC	58	17.86	16.38	14.12	15.54	
	Mercury	62	15.09	11.40	12.30	13.26	15.29
1971	Chevrolet	52	13.52	12.39	11.08	13.35	14.21
	Buick	61	12.15	13.51	17.45	8.61	13.38
1973	Mazda	38 1/	3.38		5.30	5.93	5.30
PROTOTYPE							
	Ford	43 2/	.68	.61	.66	.54	.44
	Chevrolet	46 3/	.42	.49	.35	.48	
	Plymouth	48	1.65	1.09	.55	.39	.77
	Ford	56	.08	.11	.09	.12	.10
PROCO							
	Ford	47	.12	.12	.22	.11	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

TABLE C-12.--Effect of ambient temperature on emissions of reactive hydrocarbon over the hot transient phase (Results are average of duplicate tests)

Vehicle description			Reactive hydrocarbon, grams per test				
			Test temperature, F				
Model year	Manu-facturer	Code	20	50	75	110	110 w/air
STANDARD PRODUCTION							
1967	Ford	49	15.14	15.67	14.78	15.13	
1969	Ford	54	17.48	16.48	15.52	17.76	
	AMC	58	14.45	14.21	12.76	14.22	
	Mercury	62	10.21	9.01	9.75	11.33	13.30
1971	Chevrolet	52	8.68	7.65	7.36	6.01	11.64
	Buick	61	9.30	7.72	13.57	11.26	10.77
1973	Mazda	38 1/	10.09		12.04	14.15	18.99
PROTOTYPE							
	Ford	45 2/	1.03	3.54	2.73	2.45	2.82
	Chevrolet	46 3/	.63	.72	.69	.91	
	Plymouth	48	1.49	1.14	.92	1.04	1.60
	Ford	56	.40	.58	.47	2.29	2.51
PROCO							
	Ford	47	.49	.33	.16	.27	

NOTE.--Reactive hydrocarbon is total hydrocarbon less methane, ethane, propane, acetylene and benzene
Emissions calculated using CH ratio 1.85

1/ Single test for 75 F
2/ Single test for 20 F, 50 F, 110 F w/air
3/ Single test for 20 F

APPENDIX D (4 pages)

Effect of ambient temperature on emissions for vehicle no. 69, 70, and 71

TABLE D-1. - Effect of ambient temperature on emissions 1/

(Vehicle No. 69, 1974 360 CID Plymouth)

	Ambient temperature F			
	60	70	80	90
Emissions, grams/test phase				
			COLD TRANSIENT PHASE	
Carbon monoxide	326.65	121.87	91.20	94.27
Carbon dioxide	3289.79	3322.76	3304.65	3136.32
Hydrocarbon (as CH1.85)	18.02	12.30	11.25	[illegible]
Oxides of nitrogen (as NO2) 2/	[illegible]	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO)				
Fuel used, grams/test phase	1217.05	1119.95	1098.25	1041.50
			STABILIZED PHASE	
Carbon monoxide	38.35	37.76	40.04	55.15
Carbon dioxide	3638.63	3617.27	3632.13	3521.56
Hydrocarbon (as CH1.85)	6.01	5.60	5.85	6.57
Oxides of nitrogen (as NO2) 2/	[illegible]	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO)				
Fuel used, grams/test phase	1172.15	1164.75	1170.85	1144.15
			HOT TRANSIENT PHASE	
Carbon monoxide	39.52	44.41	56.55	76.59
Carbon dioxide	2930.61	2902.64	2863.76	2736.17
Hydrocarbon (as CH1.85)	6.67	7.23	7.52	[illegible]
Oxides of nitrogen (as NO2) 2/	[illegible]	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO)				
Fuel used, grams/test phase	950.20	944.40	928.40	908.60
Emissions, grams/mile				
			1975 CVS WEIGHTED EMISSIONS	
Carbon monoxide	26.84	[illegible]	[illegible]	[illegible]
Carbon dioxide	[illegible]	[illegible]	[illegible]	[illegible]
Hydrocarbon (as CH1.85)	[illegible]	[illegible]	[illegible]	[illegible]
Oxides of nitrogen (as NO2) 2/	[illegible]	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO)				
[illegible]				[illegible]

(Vehicle No. 70, 1974 350 CID Chevrolet)

	Ambient temperature F			
	60	70	80	90
Emissions, grams/test phase				
	COLD TRANSIENT PHASE			
Carbon monoxide..................	308.01	247.45	197.19	187.20
Carbon dioxide...................	3174.95	3205.05	3203.11	3155.20
Hydrocarbon (as CH1.85)..........	10.35	8.68	7.23	7.57
Oxides of nitrogen (as NO2) 2/..	9.38	9.67	8.91	7.74
Total aldehydes (as HCHO).......	.74	.55	.63	.53
Fuel used, grams/test phase.....	1164.25	1142.00	1115.10	1095.30
	STABILIZED PHASE			
Carbon monoxide..................	130.15	123.04	114.49	118.90
Carbon dioxide...................	3670.37	3867.21	3871.01	3828.61
Hydrocarbon (as CH1.85)..........	6.05	5.69	5.15	5.40
Oxides of nitrogen (as NO2) 2/..	6.01	6.43	6.47	6.09
Total aldehydes (as HCHO).......	.75	.60	.76	.73
Fuel used, grams/test phase.....	1228.05	1286.15	1282.70	1271.70
	HOT TRANSIENT PHASE			
Carbon monoxide..................	144.22	138.90	141.57	154.13
Carbon dioxide...................	2940.58	2998.21	2957.69	2851.85
Hydrocarbon (as CH1.85)..........	5.40	5.34	5.99	6.32
Oxides of nitrogen (as NO2) 2/..	7.36	7.34	6.99	6.46
Total aldehydes (as HCHO).......	.52	.39	.49	.46
Fuel used, grams/test phase.....	1004.15	1019.60	1008.85	982.00
Emissions, grams/mile				
	1975 CVS WEIGHTED EMISSIONS			
Carbon monoxide..................	45.97	41.15	37.33	38.30
Carbon dioxide...................	894.90	927.25	924.56	908.12
Hydrocarbon (as CH1.85)..........	1.81	1.66	1.56	1.63
Oxides of nitrogen (as NO2) 2/..	1.91	2.07	1.90	1.75
Total aldehydes (as HCHO).......	.18	.14	.17	.16
Fuel economy, mpg (1975 CVS)....	9.12	8.90	8.98	9.12

1/ All results are averages of duplicate tests.
2/ NOx corrected to 75 grains water vapor.

TABLE B-[illegible]. - Effect of ambient temperature on emissions 1/

(Vehicle No. 71, 1974 351 CID Ford)

	Ambient temperature F			
	60	70	80	90
Emissions, grams/test phase				
	COLD TRANSIENT PHASE			
Carbon monoxide..................	234.05	148.09	116.29	37.02
Carbon dioxide..................	3292.00	3475.67	3230.03	3337.05
Hydrocarbon (as CH1.85).........	12.85	10.20	5.60	7.71
Oxides of nitrogen (as NO2) 2/..	12.27	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO).......				
Fuel used, grams/test phase.....	1162.15	1179.80	1085.65	1076.40
	STABILIZED PHASE			
Carbon monoxide..................	46.69	45.46	46.88	40.07
Carbon dioxide..................	3751.37	3932.53	3668.19	3680.83
Hydrocarbon (as CH1.85).........	5.44	5.79	5.36	5.62
Oxides of nitrogen (as NO2) 2/..	[illegible]	[illegible]	[illegible]	[illegible]
Total aldehydes (as HCHO).......				
Fuel used, grams/test phase.....	1211.30	1236.60	1195.10	1189.95
	HOT TRANSIENT PHASE			
Carbon monoxide..................	53.75	59.01	65.63	85.25
Carbon dioxide..................	2953.39	2939.33	2873.06	2953.33
Hydrocarbon (as CH1.85).........	8.84	9.48	9.04	10.22
Oxides of nitrogen (as NO2) 2/..	12.22	12.51	11.75	12.71
Total aldehydes (as HCHO).......				
Fuel used, grams/test phase.....	963.15	965.45	947.95	985.55
Emissions, grams/mile				
	1975 CVS WEIGHTED EMISSIONS			
Carbon monoxide..................	[illegible]	19.38	[illegible]	10.45
Carbon dioxide..................	[illegible]	[illegible]	[illegible]	900.83
Hydrocarbon (as CH1.85).........	[illegible]	[illegible]	[illegible]	1.97
Oxides of nitrogen (as NO2) 2/..	[illegible]	[illegible]	1.96	[illegible]
Total aldehydes (as HCHO).......	[illegible]	[illegible]	[illegible]	[illegible]
Fuel economy, mpg (17 [illegible])....	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX E (29 pages)

Vehicle temperatures

Temperatures listed at 10 time intervals during the 41 minute test for air to car coolant, air and air to carburetor. The temperatures are averages of duplicate tests for each of 25 vehicles tested at 20°, 50°, 75°, and 110° F.

TABLE E-1. - Vehicle temperatures during tests

(Vehicle No. 38, 1973 Mazda)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	21	21	20	20	157	121	102
2	19	31	30	27	22	146	123	119
4	21	67	56	45	24	145	121	105
8.4	22	133	110	82	24	145	124	101
16	24	143	115	108				
22.9	24	148	125	118				
75° F AMBIENT								
0	73	76	75	76	74	174	155	134
2	76	88	91	81	77	171	160	140
4	78	124	121	92	77	170	162	131
8.4	78	164	151	119	77	172	165	128
16	77	169	157	130				
22.9	78	171	161	140				
110° F AMBIENT								
0	106	108	107	107	106	189	175	153
2	108	119	120	109	109	189	184	144
4	110	149	146	117	110	189	187	142
8.4	109	181	177	134	110	191	188	143
16	109	185	181	131				
22.9	109	189	187	143				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	105	107	107	105	105	201	186	160
2	107	121	126	111	110	201	195	150
4	110	155	157	123	111	202	198	144
8.4	109	189	188	135	111	202	198	143
16	111	199	190	139				
22.9	109	202	197	148				

TABLE E-2. - Vehicle temperatures during tests

(Vehicle No. 13, 1972 Ford Torino)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	air to carburetor
20° F AMBIENT								
0	18	20	20	19	24	192	140	93
2	19	59	20	50	22	172	165	106
4	21	104	55	75	22	172	167	100
8.4	22	146	118	109	26	178	183	94
16	23	165	148	96				
22.9	25	176	169	94				
75° F AMBIENT								
0	74	77	77	77	79	200	171	126
2	75	115	84	91	76	192	194	121
4	76	147	108	106	77	193	199	114
8.4	76	188	159	107	77	195	207	120
16	76	193	192	112				
22.9	76	197	200	124				
110° F AMBIENT								
0	105	106	105	106	107	227	186	150
2	107	141	112	112	108	201	207	151
4	109	171	134	122	111	199	211	147
8.4	109	198	184	141	110	202	217	150
16	110	199	206	144				
22.9	109	204	211	156				
110° F AMBIENT WITH AIR CONDITIONER ON								
0	103		108	107	106		190	154
2	108		114	114	109		211	160
4	110		137	127	111		218	153
8.4	110		211	140	111		224	158
16	109		214	149				
22.9	108			160				

TABLE E-3.- Vehicle temperatures during tests

(Vehicle No. 40, 1973 Volvo)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor 1/	Air to car	water	Oil	Air to carburetor
				20° F AMBIENT				
0	17	19	20	20	19	177	113	106
2	19	70	20	20	20	162	117	41
4	20	135	22	21	20	170	111	43
8.4	22	173	59	24	23	181	121	50
16	22	172	103	25				
22.9	21	179	129	27				
				75° F AMBIENT				
0	72	75	74	73	74	189	153	118
2	74	143	74	76	75	164	156	87
4	76	173	82	76	76	169	162	80
8.4	77	170	118	79	76	170	165	80
16	76	171	147	79				
22.9	75	170	163	82				
				110° F AMBIENT				
0	103	110	108	108	103	202	166	149
2	108	164	110	107	106	167	173	116
4	109	180	118	109	109	172	183	111
8.4	109	174	158	111	108	174	186	111
16	109	175	177	111				
22.9	108	173	190	117				
				110° F AMBIENT WITH AIR-CONDITIONER ON				
0	102		109	108	105		180	162
2	108		111	108	109		188	121
4	110		120	109	110		193	116
8.4	109		154	113	109		197	114
16	110		183	112				
22.9	109		203	115				

1/ From air filter into intake manifold.

TABLE E-4.- Vehicle temperatures during tests

(Vehicle No. 41, 1973 Ford LTD)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	16	20	20	20	22	197	132	94
2	19	70	21	41	21	183	176	96
4	21	133	47	64	22	185	182	89
8.4	24	184	145	90	25	186	190	98
16	24	184	176	99				
22.9	24	184	179	99				
75° F AMBIENT								
0	74	77	75	77	75	204	167	122
2	75	131	79	97	74	189	194	104
4	76	175	114	99	77	191	198	99
8.4	77	190	172	98	77	191	204	96
16	77	190	193	96				
22.9	77	194	194	103				
110° F AMBIENT								
0	104	113	108	108	105	215	186	150
2	108	158	114	108	107	205	207	135
4	110	191	146	111	108	205	211	127
8.4	111	196	160	126	110	207	217	129
16	110	199	206	124				
22.9	109	206	208	135				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	105	109	109	109	105	229	186	150
2	106	135	118	110	108	208	212	136
4	109	162	148	116	110	209	216	129
8.4	110	202	190	126	110	213	225	129
16	109	203	211	126				
22.9	109	210	216	132				

TABLE E-5.- Vehicle temperatures during tests

(Vehicle No. 42, 1973 Chevrolet Laguna)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	16		21	20	20		151	89
2	19		22	40	20		165	92
4	21		54	78	22		169	97
8.4	22		91	104	24		185	89
16	23		158	100				
22.9	23		176	90				
75° F AMBIENT								
0	73	76	76	75	75	212	179	124
2	76	101	78	102	76	190	190	119
4	77	140	97	105	75	185	193	107
8.4	77	178	158	105	76	179	203	116
16	76	178	185	108				
22.9	75	185	196	115				
110° F AMBIENT								
0	104	109	107	107	107	217	193	147
2	105	131	113	111	109	195	200	148
4	109	165	128	116	111	195	205	144
8.4	109	191	180	140	110	193	214	148
16	109	191	198	142				
22.9	108	193	206	146				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	109		109	107	103		195	151
2	107		114	112	108		201	151
4	110		129	121	111		206	149
8.4	110		182	145	111		217	151
16	109		201	145				
22.9	109		208	151				

(Vehicle No. 43, 1973 Ford LTD Catalyst Equipped)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20°F AMBIENT								
0	17	20	20	19	20	205	152	106
2	20	56	22	29	22	188	169	76
4	21	118	52	42	25	187	182	66
8.4	24	186	139	65	27	190	186	74
16	26	187	165	65				
22.9	27	192	182	79				
50°F AMBIENT								
0	49	51	50	50	49	214	159	122
2	51	95	55	63	48	188	183	100
4	52	153	93	70	50	190	188	96
8.4	51	191	158	83	49	193	199	96
16	50	190	174	86				
22.9	50	194	187	94				
75° F AMBIENT								
0	73	76	73	77	75	214	168	140
2	75	105	76	87	73	188	186	125
4	77	142	99	97	75	189	192	112
8.4	76	183	152	100	76	193	198	120
16	76	188	181	121				
22.9	75	195	190	130				
110° F AMBIENT								
0	105	108	107	113	109	222	184	180
2	105	115	109	114	108	205	201	171
4	109	152	122	120	111	195	201	166
8.4	110	189	168	153	112	200	213	171
16	111	197	198	154				
22.9	110	200	205	168				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	106	108	107	114	108	226	190	213
2	109	139	114	124	110	205	206	224
4	112	174	136	148	111	202	214	226
8.4	110	199	180	191	111	204	218	230
16	111	199	204	215				
22.9	111	205	210	225				

TABLE E-7.- Vehicle temperatures during tests

(Vehicle No. 44, 1973 Opel Diesel)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor 1/	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	21	20	19	16	105	113	72
2	18	26	26	20	18	80	134	30
4	20	53	48	21	20	88	136	25
8.4	20	87	109	25	21	92	146	26
16	20	77	137	24				
22.9	18	87	143	27				
50° F AMBIENT								
0	45	51	52	52	48	144	130	92
2	48	61	61	49	50	114	151	61
4	50	92	82	52	51	120	154	56
8.4	52	106	133	55	51	117	165	57
16	50	108	151	54				
22.9	51	130	150	57				
75° F AMBIENT								
0	70	79	76	83	73	170	143	145
2	72	83	87	100	75	141	163	135
4	75	105	104	110	75	133	166	130
8.4	76	139	148	120	76	142	173	133
16	75	124	163	125				
22.9	75	131	169	135				
110° F AMBIENT								
0	107	107	105	119	107	182	166	178
2	110	115	115	127	111	161	179	200
4	110	150	132	150	110	166	183	203
8.4	110	158	167	183	110	165	190	215
16	110	152	180	197				
22.9	111	159	185	212				

1/ From air filter into intake manifold.

TABLE E-8.- Vehicle temperatures during tests

(Vehicle No. 45, 1974 Ford LTD)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				20° F AMBIENT				
0	17	21	20	20	22	220	157	86
2	19	84	20	35	20	194	195	94
4	20	152	54	40	22	195	202	104
8.4	24	194	145	120	25	198	210	99
16	25	196	198	88				
22.9	25	195	207	94				
				75° F AMBIENT				
0	77	79	77	76	72	225	181	120
2	77	136	85	93	76	197	206	117
4	78	190	119	107	76	196	211	105
8.4	78	186	186	103	77	200	220	102
16	75	197	210	98				
22.9	75	201	215	118				
				110° F AMBIENT				
0	107	109	107	109	105	243	198	159
2	106	155	116	109	109	210	221	139
4	110	199	144	114	111	209	228	133
8.4	110	205	201	129	112	213	236	137
16	110	205	220	129				
22.9	110	211	226	136				

TABLE E-9.- Vehicle temperatures during tests

(Vehicle No. 46, 1973 Chevrolet Catalyst Equipped)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	19	23	23	20	24	212	151	89
2	21	48	25	32	25	191	161	83
4	22	114	36	50	30	193	167	77
8.4	25	189	116	70	30	195	179	74
16	28	191	155	70				
22.9	30	193	175	80				
50° F AMBIENT								
0	48	51	50	50	52	219	164	108
2	49	78	51	65	50	194	175	99
4	51	129	65	78	51	196	189	95
8.4	51	185	128	91	52	199	197	97
16	52	194	169	88				
22.9	52	198	189	100				
75° F AMBIENT								
0	82	79	81	78	75	220	183	122
2	79	106	83	92	74	197	185	108
4	75	165	99	93	76	198	198	103
8.4	79	197	160	103	77	200	207	106
16	75	197	185	100				
22.9	75	200	200	106				
110° F AMBIENT								
0	107	106	106		107	230	195	
2	110	131	109		109	200	200	
4	110	176	125		111	201	209	
8.4	111	201	180		111	203	216	
16	111	201	198					
22.9	111	202	208					
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	108	108	108	108	110	231	197	146
2	110	135	111	109	110	207	202	142
4	109	180	129	113	110	203	210	130
8.4	110	202	185	118	111	204	219	132
16	111	202	203	125				

(Vehicle No. 48, 1973 Chrysler Plymouth Sattelite)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	25	23	23	19	207	132	100
2	19	61	24	38	19	184	142	77
4	21	112	36	55	24	190	145	82
8.4	24	182	87	78	19	189	157	89
16	27	186	133	86				
22.9	27	187	157	83				
50° F AMBIENT								
0	48	50	48	49	48	212	153	118
2	49	79	50	59	49	188	157	99
4	53	128	60	71	50	190	158	87
8.4	51	188	108	81	51	196	167	89
16	52	191	147	85				
22.9	49	192	165	94				
75° F AMBIENT								
0	73	78	77	76	74	212	162	145
2	73	111	80	79	76	192	167	121
4	75	159	91	81	76	194	169	110
8.4	77	194	139	103	77	199	181	117
16	76	194	163	108				
22.9	77	197	176	118				
110° F AMBIENT								
0	109	107	107	109	108	202	203	161
2	109	122	124	111	110	195	195	150
4	109	149	151	117	111	197	196	148
8.4	110	182	184	144	113	206	205	154
16	111	194	194	142				
22.9	112	201	201	152				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	109	108	108	107	111	237	192	176
2	111	138	111	111	111	217	199	163
4	111	182	124	123	111	215	201	159
8.4	111	209	169	149	112	222	210	165
16	112	214	194	153				
22.9	111	220	204	162				

TABLE E-11. - Vehicle temperatures during tests

(Vehicle No. 49, 1967 Ford Galaxie-500)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	24	22	21	18	178	150	71
2	18	58	24	23	18	175	179	73
4	21	118	37	30	21	177	183	58
8.4	22	183	138	47	24	182	203	65
16	23	177	183	52				
22.9	24	173	189	61				
50° F AMBIENT								
0	50	50	50	50	50	187	161	91
2	50	80	50	52	49	181	179	87
4	52	103	76	62	52	182	191	78
8.4	51	182	159	77	51	190	211	83
16	52	182	193	77				
22.9	52	185	200	82				
75° F AMBIENT								
0	80	80	79	78	77	197	174	112
2	80	114	80	80	77	187	197	115
4	77	145	109	82	75	185	200	106
8.4	75	193	176	108	76	199	221	112
16	75	190	205	109				
22.9	76	193	211	107				
110° F AMBIENT								
0	108	108	108	108	110	212	193	145
2	110	112	109	111	109	202	215	148
4	109	142	121	114	111	203	222	142
8.4	111	201	193	138	111	212	234	145
16	111	203	219	141				
22.9	111	207	225	148				

TABLE E-12. Vehicle temperatures during tests

(Vehicle No. 50, 1971 Ford Galaxie-500)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				20° F AMBIENT				
0	16	22	20	19	22	208	139	86
2	16	62	20	27	20	190	162	79
4	18	114	22	39	22	191	172	74
8.4	21	191	108	56	25	188	182	82
16	23	190	156	74				
22.9	25	188	173	86				
				50° F AMBIENT				
0	49	49	49	49	51	211	149	108
2	51	90	49	58	50	191	174	103
4	52	139	71	68	49	193	187	101
8.4	51	190	141	92	50	195	196	106
16	50	192	175	103				
22.9	50	192	188	113				
				75° F AMBIENT				
0	73	76	75	74	74	219	167	127
2	76	112	75	83	75	190	190	123
4	77	161	100	92	74	193	196	115
8.4	78	192	159	117	76	196	206	119
16	75	192	188	112				
22.9	77	195	198	120				
				110° F AMBIENT				
0	106	108	106	106	113	229	186	154
2	109	140	109	114	112	201	207	151
4	111	178	126	124	111	198	213	148
8.4	110	198	179	140	112	216	225	150
16	111	198	202	144				
22.9	112	204	212	151				

TABLE E-13. - Vehicle temperatures during tests

(Vehicle No. 51, 1971 Chevrolet Impala)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	21	20		21	210	143	
2	18	68	23		19	193	140	
4	20	126	36		21	197	141	
8.4	21	190	87		25	200	153	
16	23	192	126					
22.9	23	191	155					
50° F AMBIENT								
0	49	49	49	50	53	217	154	110
2	50	92	51	84	53	195	158	123
4	51	148	65	119	49	199	157	126
8.4	50	195	114	133	49	202	170	116
16	50	196	146	119				
22.9	51	200	168	106				
75° F AMBIENT								
0	72	72	70	72	73	220	158	123
2	71	111	73	93	74	199	164	127
4	75	177	84	118	72	203	168	127
8.4	77	200	137	127	74	202	184	128
16	74	200	163	133				
22.9	74	199	169	132				
110° F AMBIENT								
0	107	107	107	106	112	228	186	146
2	109	121	108	117	112	200	189	147
4	110	162	115	136	111	202	189	136
8.4	110	200	157	138	111	210	202	144
16	111	204	184	140				
22.9	110	208	195	141				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	106	108	107	106	113	231	187	149
2	111	115	107	117	113	205	193	145
4	110	181	117	137	110	205	191	141
8.4	111	205	162	143	110	215	207	145
16	111	205	192	135				
22.9	111	212	201	144				

(Vehicle No. 52, 1971 Chevrolet Impala)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	21	21	20	24	203	156	81
2	17	63	21	33	22	192	177	88
4	20	122	40	57	23	202	176	98
8.4	23	197	106	92	20	200	193	114
16	23	198	163	105				
22.9	24	201	185	110				
50° F AMBIENT								
0	49	50	50	50	51	213	168	98
2	50	94	51	55	48	193	189	93
4	52	132	78	107	50	204	193	97
8.4	53	202	136	95	50	204	202	95
16	50	202	183	93				
22.9	51	202	196	91				
75° F AMBIENT								
0	72	79	77	76	76	221	185	119
2	71	115	78	85	76	199	201	102
4	73	155	96	99	75	206	199	104
8.4	76	201	162	98	75	207	211	105
16	76	202	193	97				
22.9	75	207	206	101				
110° F AMBIENT								
0	107	106	106	108	109	228	201	144
2	109	109	106	109	110	206	212	144
4	111	184	114	110	111	207	214	131
8.4	110	208	175	125	111	217	229	133
16	110	207	210	125				
22.9	111	213	219	132				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	109	109	109	109	109	236	212	150
2	110	114	108	112	110	214	221	151
4	110	178	118	115	110	216	224	137
8.4	112	211	185	133	111	222	238	138
16	111	216	220	129				
22.9	111	216	228	141				

TABLE E-15. - Vehicle temperatures during tests

(Vehicle No. 53, 1967 Chevrolet Impala)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17			19	18			78
2	20			21	19			72
4	20			24	21			55
8.4	21			32	24			63
16	23			48				
22.9	24			60				
50° F AMBIENT								
0	49	53	53	52	53	199	141	110
2	51	88	54	53	51	182	136	104
4	52	136	57	54	51	188	131	79
8.4	51	195	87	79	51	191	150	90
16	50	191	120	82				
22.9	50	192	139	89				
75° F AMBIENT								
0	73	80	77	76	74	203	153	113
2	75	86	77	77	73	195	147	100
4	75	140	79	77	75	192	146	107
8.4	75	193	110	108	74	194	163	110
16	76	190	141	104				
22.9	74	193	154	110				
110° F AMBIENT								
0	105	106	106	106	106	213	174	154
2	106	119	106	108	108	192	174	156
4	109	156	109	110	109	194	172	138
8.4	108	195	147	139	109	204	186	141
16	110	194	166	137				
22.9	110	200	178	144				

TABLE E-16. - Vehicle temperatures during tests

(Vehicle No. 54, 1969 Ford Galaxie-500)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				20° F AMBIENT				
0	19	23	21	20	20	190	141	82
2	19	46	22	25	19	182	172	87
4	18	106	42	42	22	186	187	84
8.4	21	176	141	85	26	187	203	103
16	24	183	183	96				
22.9	24	183	192	102				
				50° F AMBIENT				
0	48	51	49	49	49	204	156	101
2	50	59	50	58	49	184	191	102
4	51	143	63	78	50	186	197	91
8.4	51	184	151	112	50	191	210	92
16	52	188	193	85				
22.9	51	190	202	96				
				75° F AMBIENT				
0	72	80	76	75	75	209	164	116
2	73	84	77	81	74	190	193	118
4	76	154	96	92	76	189	202	109
8.4	75	192	164	110	76	199	217	111
16	75	191	201	104				
22.9	75	197	210	112				
				110° F AMBIENT				
0	105	108	104	105	110	220	186	148
2	106	118	106	114	110	202	214	151
4	109	188	120	123	108	202	218	143
8.4	110	202	190	136	110	206	229	143
16	109	200	219	136				
22.9	110	205	225	145				

TABLE E-17. - Vehicle temperatures during tests

(Vehicle No. 55, 1970 Chrysler Newport)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	23	22	20	23	172	124	90
2	18	67	22	42	23	146	133	60
4	20	118	22	48	23	148	137	54
8.4	23	138	82	61	26	158	150	66
16	24	140	128	46				
22.9	25	147	139	64				
50° F AMBIENT								
0	49	52	51	51	53	196	146	115
2	49	96	52	72	54	165	158	82
4	52	137	62	66	50	164	163	77
8.4	52	158	124	75	50	174	172	84
16	53	163	150	72				
22.9	52	172	164	83				
75° F AMBIENT								
0	73	79	78	76	75	214	166	136
2	73	119	79	78	77	183	178	113
4	75	148	94	85	77	181	183	104
8.4	76	173	146	100	78	190	193	105
16	76	179	171	96				
22.9	76	187	185	108				
110° F AMBIENT								
0	106	109	107	107	106	221	188	164
2	107	138	110	111	110	203	201	145
4	109	165	124	115	111	200	207	135
8.4	109	194	169	128	112	208	211	142
16	110	199	196	130				
22.9	110	207	207	148				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	108	107	107	108	110	233	197	170
2	110	138	108	112	110	210	211	140
4	110	169	124	123	111	211	215	137
8.4	111	203	174	140	111	222	226	143
16	112	208	206	131				
22.9	111	218	215	156				

TABLE E-10. Vehicle temperatures during tests

(Vehicle No. 56, 1974 Ford Pinto Station Wagon, with catalyst)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				20° F AMBIENT				
0	19	21	20	20	20	160	129	89
2	18	21	21	33	21	147	122	89
4	21	38	29	64	23	135	127	73
8.4	24	119	90	108	26	132	139	84
16	25	127	115	92				
22.9	24	132	131	85				
				50° F AMBIENT				
0	50	52	50	51	50	166	147	112
2	51	52	52	62	52	158	147	93
4	52	67	62	78	52	145	150	96
8.4	53	118	116	95	52	140	159	101
16	52	134	135	92				
22.9	52	139	150	95				
				75° F AMBIENT				
0	71	75	74	73	73	167	158	147
2	75	75	76	90	75	163	141	145
4	76	83	87	108	76	153	164	129
8.4	76	125	137	125	76	148	172	148
16	75	141	154	137				
22.9	74	146	165	134				
				110° F AMBIENT				
0	110	108	107	109	109	183	179	154
2	110	109	108	110	111	183	182	141
4	112	116	120	113	111	176	187	130
8.4	112	153	163	126	112	173	194	132
16	111	166	180	128				
22.9	111	170	188	134				
				110° F AMBIENT WITH AIR-CONDITIONER ON				
0	108	109	108	109	108	188	182	159
2	110	110	110	110	110	187	147	148
4	111	117	124	115	111	181	152	135
8.4	112	151	165	134	112	179	152	140
16	112	171	167	137				
22.9	111	176	159	143				

TABLE E-19 . - Vehicle temperatures during tests

(Vehicle No. 57, 1969 Chevrolet Malibu)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	22	21	20	19	192	122	81
2	20	61	23	34	19	184	119	75
4	20	116	30	56	23	191	115	78
8.4	22	192	76	79	26	188	130	93
16	24	185	105	84				
22.9	25	191	126	88				
50° F AMBIENT								
0	47	52	51	50	48	200	144	100
2	50	85	54	61	50	189	143	101
4	51	137	61	81	51	194	140	104
8.4	50	189	106	107	50	193	154	101
16	51	189	128	99				
22.9	50	193	146	96				
75° F AMBIENT								
0	72	76	75	74	73	208	158	119
2	75	97	77	84	75	187	155	109
4	76	150	85	103	75	188	152	110
8.4	76	181	130	110	75	185	167	115
16	76	180	144	109				
22.9	75	184	159	112				
110° F AMBIENT								
0	108	107	108	109	110	178	179	145
2	110	111	110	118	111	177	177	140
4	111	119	118	122	111	176	176	133
8.4	111	157	158	129	112	188	187	136
16	111	171	169	130				
22.9	112	180	178	135				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	108	108	108	107	109	222	181	150
2	109	127	110	116	110	203	180	144
4	109	171	121	121	110	204	182	139
8.4	111	202	162	135	112	207	200	142
16	111	203	174	136				
22.9	111	209	184	142				

TABLE E-20. - Vehicle temperatures during tests

(Vehicle No. 58, 1969 Rambler Ambassador)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	23	22	21	20	200	148	78
2	19	61	22	25	22	188	171	79
4	21	110	52	36	24	187	179	72
8.4	23	185	125	58	26	191	192	78
16	25	186	169	73				
22.9	26	184	184	81				
50° F AMBIENT								
0	50	49	49	51	52	207	161	101
2	48	82	54	55	52	186	185	100
4	52	130	76	64	52	189	190	97
8.4	53	188	141	85	50	194	200	103
16	53	187	182	100				
22.9	52	193	190	107				
75° F AMBIENT								
0	72	72	72	73	76	215	175	115
2	77	106	78	78	76	192	194	113
4	76	156	100	88	76	195	199	107
8.4	76	192	163	111	76	198	208	108
16	76	191	194	104				
22.9	76	197	199	106				
110° F AMBIENT								
0	109	108	108	108	111	223	191	147
2	111	141	112	110	110	201	208	146
4	111	178	132	120	111	203	213	140
8.4	112	202	191	131	112	206	222	139
16	111	202	211	133				
22.9	111	206	216	140				

TABLE E-21. - Vehicle temperatures during tests

(Vehicle No. 59, 1967 Plymouth Fury III)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	22	20	24	19	192	132	88
2	20	56	21	22	21	178	137	66
4	22	93	24	23	23	178	137	54
8.4	24	177	80	30	26	182	152	59
16	25	182	127	48				
22.9	26	185	145	56				
50° F AMBIENT								
0	49	50	49	50	49	200	150	110
2	51	84	50	53	50	183	156	93
4	51	129	59	54	51	182	156	86
8.4	52	180	108	69	51	185	165	88
16	52	181	145	81				
22.9	52	185	162	90				
75° F AMBIENT								
0	75	74	74	75	74	203	161	130
2	77	106	75	78	75	180	167	122
4	77	150	84	79	75	182	167	111
8.4	76	183	132	100	75	186	176	114
16	77	183	161	106				
22.9	77	186	173	114				
110° F AMBIENT								
0	108	109	109	108	109	215	180	155
2	110	140	111	110	110	191	185	151
4	110	180	121	114	110	190	186	145
8.4	110	192	163	138	110	197	198	145
16	110	190	183	141				
22.9	111	196	190	147				

(Vehicle No. 60, 1970 Oldsmobile Cutlass)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	16	22	21	19	20	188	120	81
2	18	71	22	38	21	166	125	85
4	19	118	32	60	23	169	129	89
8.4	22	163	81	90	26	175	138	103
16	24	165	113	85				
22.9	24	171	128	99				
50° F AMBIENT								
0	48	49	49	49	51	202	140	102
2	50	94	51	67	50	178	147	106
4	52	140	63	87	51	178	149	108
8.4	52	176	108	107	51	184	154	109
16	52	179	138	103				
22.9	50	187	152	110				
75° F AMBIENT								
0	72	74	75	73	75	208	156	121
2	74	117	76	89	75	183	163	121
4	76	154	88	106	76	184	164	115
8.4	76	184	130	113	75	188	169	120
16	76	186	155	111				
22.9	76	192	167	120				
110° F AMBIENT								
0	106	108	108	107	112	220	177	149
2	110	147	111	113	110	195	182	152
4	110	174	121	121	110	196	186	147
8.4	111	198	158	138	110	200	192	146
16	111	193	178	141				
22.9	110	199	185	148				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	107	108	108	109	110	229	184	156
2	110	148	111	115	110	208	191	159
4	111	178	121	126	110	207	194	156
8.4	111	203	162	147	111	210	199	156
16	111	200	184	151				
22.9	110	209	192	160				

TABLE E-23. - Vehicle temperatures during tests

(Vehicle No. 61, 1971 Buick Electra)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	18	22	21	21	20	218	141	96
2	19	80	22	42	20	181	135	107
4	21	155	30	67	24	186	130	99
8.4	24	188	89	98	27	192	143	102
16	26	185	121	102				
22.9	25	189	143	113				
50° F AMBIENT								
0	49	49	49	49	57	223	155	113
2	51	99	50	68	52	189	153	120
4	51	169	58	90	52	190	149	116
8.4	51	189	111	113	51	194	159	121
16	50	189	137	116				
22.9	49	198	157	119				
75° F AMBIENT								
0	72	76	75	75	75	230	172	132
2	75	128	76	92	75	192	166	135
4	76	172	85	110	76	192	166	123
8.4	76	197	135	120	76	196	172	124
16	76	192	154	117				
22.9	76	200	172	132				
75° F AMBIENT WITH AIR-CONDITIONER ON								
0	75	76	77	75	83	234	176	141
2	76	128	77	106	75	205	173	141
4	77	180	85	107	75	202	175	132
8.4	77	198	137	123	75	207	184	138
16	77	194	160	126				
22.9	75	210	177	141				
110° F AMBIENT								
0	107	109	108	108	112	242	193	161
2	110	161	110	115	110	214	191	160
4	109	194	121	121	110	213	191	154
8.4	110	207	164	147	110	219	203	157
16	111	209	181	147				
22.9	111	219	195	157				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	106	108	107	107	110	244	198	164
2	110	162	110	124	110	223	196	166
4	111	199	125	130	110	223	198	164
8.4	110	218	169	161	110	230	210	168
16	110	216	187	158				
22.9	110	222	202	170				

(Vehicle No. 62, 1969 Mercury Monterey)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	21	19	19	21	203	129	96
2	18	59	24	31	20	190	180	86
4	19	114	56	43	22	190	188	83
8.4	21	188	130	66	26	196	200	94
16	23	190	171	76				
22.9	24	192	190	99				
50° F AMBIENT								
0	50	51	51	51	52	208	141	115
2	53	86	60	59	52	192	188	111
4	54	133	90	73	52	195	195	112
8.4	52	192	151	98	51	198	208	123
16	50	194	182	108				
22.9	50	197	194	117				
75° F AMBIENT								
0	72	74	73	73	74	211	155	132
2	74	107	86	82	75	192	194	134
4	75	154	109	93	73	196	200	132
8.4	74	195	159	126	74	200	210	143
16	75	195	189	132				
22.9	74	200	200	140				
110° F AMBIENT								
0	109	107	106	109	111	217	173	161
2	109	139	117	115	110	195	205	162
4	111	180	136	130	109	197	211	164
8.4	110	200	184	166	110	204	222	173
16	111	196	205	165				
22.9	112	201	210	171				
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	106	107	106	107	108	220	176	163
2	109	139	120	121	110	201	210	168
4	110	186	140	138	109	202	217	173
8.4	110	201	184	173	110	208	227	182
16	110	198	208	172				
22.9	110	204	216	179				

TABLE E-25. - Vehicle temperatures during tests

(Vehicle No. 63, 1971 Dodge Coronet station wagon)

Time into phase, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
20° F AMBIENT								
0	17	22	22	20	21	201	169	106
2	19	66	26	45	21	183	176	100
4	20	122	60	73	23	185	185	101
8.4	22	185	140	105	25	185	197	104
16	23	182	179	108				
22.9	23	186	188	111				
50° F AMBIENT								
0	51	51	51	52	52	207	178	131
2	51	89	56	71	53	186	186	119
4	54	140	87	95	53	186	192	119
8.4	52	186	155	122	51	186	203	130
16	51	183	187	119				
22.9	51	190	193	132				
75° F AMBIENT								
0	72	75	75	72	75	212	200	141
2	76	109	80	95	74	187	196	124
4	76	156	102	110	74	190	200	124
8.4	75	188	167	128	75	192	209	125
16	75	187	195	138				
22.9	75	192	203	126				
75° F AMBIENT WITH AIR-CONDITIONER ON								
0	73	73	74		76	212	190	
2	74	112	79		76	190	197	
4	76	159	103		76	193	203	
8.4	75	191	170		75	196	214	
16	76	189	198					
22.9	76	192	207					
110° F AMBIENT								
0	107	108	108		110	217	202	
2	109	141	114		109	197	208	
4	110	182	135		110	196	213	
8.4	111	199	187		110	202	222	
16	110	195	210					
22.9	111	199	215					
110° F AMBIENT WITH AIR-CONDITIONER ON								
0	108	109	109	108	107	220	206	166
2	109	141	112	125	110	200	212	155
4	110	182	138	127	110	204	217	146
8.4	110	201	191	146	110	206	227	148
16	111	198	214	143				
22.9	110	205	219	156				

TABLE E-26. - Vehicle temperatures during tests

(Vehicle No. 69, 1974 Plymouth Fury III)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
60° F AMBIENT								
0	59	63	62	62	60	219	199	127
2	60	110	88	94	61	193	202	90
4	60	164	120	88	61	196	208	84
8.4	61	194	181	86	63	200	217	97
16	61	195	206	81				
22.9	61	200	212	84				
70° F AMBIENT								
0	68	70	70	70	69	222	201	135
2	69	121	94	102	71	194	205	104
4	71	173	127	98	71	197	211	89
8.4	71	196	185	89	71	201	218	93
16	70	196	208	88				
22.9	71	202	213	100				
80° F AMBIENT								
0	76	79	79	79	79	223	204	141
2	81	127	101	101	81	194	207	111
4	80	179	134	93	81	199	213	101
8.4	81	198	188	97	81	205	220	108
16	80	198	211	95				
22.9	82	202	217	108				
90° F AMBIENT								
0	91	90	91	91	89	224	206	146
2	91	134	110	94	91	197	209	112
4	92	189	144	96	90	201	213	112
8.4	93	200	192	114	92	206	219	122
16	90	199	213	104				
22.9	91	203	216	123				

TABLE E-27. - Vehicle temperatures during tests

(Vehicle No. 70, 1974 Chevrolet Chevelle)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
60° F AMBIENT								
0	58	62	62	61	60	222	174	118
2	61	83	65	76	60	193	177	104
4	61	130	84	91	61	200	182	97
8.4	63	199	155	101	61	203	206	106
16	61	199	178	96				
22.9	62	196	194	107				
70° F AMBIENT								
0	69	70	71	70	70	223	179	124
2	71	92	75	82	70	195	182	112
4	70	139	90	96	71	202	188	106
8.4	71	200	159	104	71	201	201	113
16	72	200	182	105				
22.9	72	201	198	112				
80° F AMBIENT								
0	76	79	79	78	79	223	182	133
2	80	100	83	92	80	197	184	118
4	81	139	98	98	80	199	189	109
8.4	81	202	168	111	80	202	202	118
16	81	200	186	111				
22.9	81	202	199	118				
90° F AMBIENT								
0	91	90	90	92	88	225	187	140
2	91	109	94	99	90	197	190	131
4	92	146	109	103	90	202	194	120
8.4	91	202	176	119	91	202	208	125
16	90	201	191	119				
22.9	91	203	204	129				

TABLE E-28. - Vehicle temperatures during tests

(Vehicle No. 71, 1974 Ford Torino)

Time, minutes	Cold start phase temperatures, °F				Hot start phase temperatures, °F			
	Air to car	Water	Oil	Air to carburetor	Air to car	Water	Oil	Air to carburetor
				60° F AMBIENT				
0	58	62	61	61	59	227	154	126
2	60	110	61	91	60	192	146	108
4	60	167	70	102	60	194	144	104
8.4	61	196	116	111	61	197	157	112
16	60	195	133	107				
22.9	59	195	151	112				
				70° F AMBIENT				
0	70	72	71	73	70	222	159	132
2	69	115	71	104	73	195	155	120
4	71	178	81	109	72	194	152	113
8.4	71	196	127	117	71	197	160	118
16	71	196	142	115				
22.9	72	195	159	121				
				80° F AMBIENT				
0	80	81	81	81	82	230	162	141
2	81	124	83	107	81	195	160	128
4	82	182	91	105	81	198	156	119
8.4	81	197	133	123	81	200	166	127
16	81	197	149	122				
22.9	81	198	164	129				
				90° F AMBIENT				
0	90	91	91	91	90	231	166	145
2	90	137	91	108	91	195	164	134
4	90	186	98	114	90	198	165	130
8.4	91	197	141	130	90	200	174	135
16	91	199	156	131				
22.9	92	199	169	136				

APPENDIX F (30 pages)

Time distribution rate of HC and CO emissions

Time distribution rate of HC and CO emissions for five time intervals of the 7.5 mile cold start driving cycle, a calculated 7.5 mile hot start trip and a 7.5 mile weighted composite trip.

TABLE F-1. -Time distribution of emission rate during 1975 CVS test

(Vehicle No.38, 1973 Mazda Rotary)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute[1]					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	20.2		10.2	6.9	4.6	33.2		18.9	14.5	11.7
343	3.43	6.6		7.5	8.0	7.2	4.5		5.4	6.9	6.3
505	2.70	5.4		6.5	6.5	6.2	1.5		4.4	5.3	5.7
935	7.17	1.0		2.1	2.1	2.4	.3		1.5	1.9	2.1
1372	7.28	1.2		2.5	3.4	4.2	.3		2.1	2.1	2.9
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	10.9		7.9	7.3	6.4	12.4		12.5	16.7	13.3
343	3.43	8.7		6.6	8.9	7.2	7.7		6.1	6.6	8.0
505	2.70	8.1		10.2	7.2	8.2	7.3		7.7	5.9	6.3
935	7.17	1.5		2.0	1.8	1.9	1.7		1.7	1.5	1.5
1372	7.28	1.8		2.4	2.9	3.4	1.9		2.4	1.7	2.0
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	15.8		8.9	7.1	5.7	29.2		15.5	15.9	12.7
343	3.43	7.6		7.0	8.5	7.2	5.1		5.8	6.7	7.4
505	2.70	6.7		8.7	6.9	7.4	2.6		6.2	5.7	6.1
935	7.17	1.3		2.0	1.9	2.1	.6		1.6	1.6	1.7
1372	7.28	1.5		2.4	3.0	3.7	.6		2.3	1.9	2.3

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[1] Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-2. - Time distribution of emission rate during 1975 CVS test

(Vehicle No. 39, 1972 351-CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	15.9		9.7	3.5	3.4	19.8		11.6	6.3	7.1
343	3.43	7.5		5.0	4.7	4.7	6.6		6.1	5.5	6.9
505	2.70	2.7		4.0	4.3	4.0	2.7		4.2	4.6	1.3
935	7.17	1.9		3.2	4.0	4.0	1.8		2.9	3.8	4.0
1372	7.28	2.3		3.7	4.9	5.0	1.6		2.8	3.7	3.8
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	4.0		4.5	5.9	5.8	5.2		4.8	7.5	9.3
343	3.43	4.6		4.9	5.0	5.2	5.6		7.3	6.5	5.5
505	2.70	4.8		4.4	4.9	5.1	4.8		4.8	5.5	4.8
935	7.17	3.9		4.0	3.5	3.4	4.1		3.6	3.2	3.3
1372	7.28	4.7		4.5	4.3	4.2	3.7		3.4	3.1	3.2
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	11.2		7.0	4.9	4.9	14.4		8.1	7.0	8.5
343	3.43	6.3		4.9	4.9	5.0	6.2		6.7	6.1	6.0
505	2.70	3.6		4.2	4.6	4.7	3.5		4.5	5.1	3.4
935	7.17	2.7		3.6	3.7	3.6	2.7		3.3	3.4	3.6
1372	7.28	3.3		4.1	4.6	4.5	2.4		3.1	3.4	3.4

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-3. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.40, 1973 121 CID Volvo w/FI)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	16.5		11.0	3.3	4.0	12.1		8.6	6.2	7.4
343	3.43	4.5		5.5	4.2	4.2	4.6		5.0	4.7	5.2
505	2.70	3.7		5.6	5.7	6.0	4.6		5.8	6.3	6.0
935	7.17	2.4		2.6	3.2	3.2	3.0		3.1	3.3	3.1
1372	7.28	2.7		3.1	5.4	5.2	3.1		3.5	4.0	3.7
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	3.5		3.9	4.5	5.8	4.6		5.8	4.6	9.6
343	3.43	5.0		6.3	4.4	4.7	4.8		4.5	5.0	5.0
505	2.70	4.7		6.1	5.9	6.9	5.5		6.4	6.1	6.4
935	7.17	4.0		3.3	3.0	2.7	3.9		3.6	3.6	2.8
1372	7.28	4.5		4.0	5.1	4.4	4.1		3.9	4.1	3.3
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	10.7		7.4	4.0	5.1	8.3		7.1	5.6	8.7
343	3.43	4.7		5.9	4.3	4.5	4.7		4.7	5.0	5.0
505	2.70	4.1		5.9	5.8	6.6	5.1		6.1	6.5	6.2
935	7.17	3.1		3.0	3.1	2.9	3.4		3.4	3.4	2.9
1372	7.28	3.5		3.6	5.2	4.7	3.6		3.7	3.9	3.4

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-4.- Time distribution of emission rate during 1975 CVS test

(Vehicle No.41,1973 351-C CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	15.5		9.3	4.9	6.1	21.8		10.9	5.9	8.2
343	3.43	6.3		7.7	6.0	5.6	5.8		5.8	5.8	5.4
505	2.70	3.9		4.3	4.1	3.6	2.6		4.0	4.5	4.2
935	7.17	2.1		2.8	3.5	3.6	1.7		3.1	3.7	3.6
1372	7.28	2.3		2.8	4.4	4.3	1.5		3.0	3.8	3.5
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	3.8		4.6	6.8	6.3	4.7		5.2	6.8	7.2
343	3.43	4.6		5.1	5.0	5.4	5.6		5.2	6.1	5.4
505	2.70	4.5		4.4	5.1	5.4	4.7		4.6	5.4	4.9
935	7.17	4.2		4.1	3.3	3.3	4.2		4.0	3.3	3.6
1372	7.28	4.5		4.2	4.1	4.0	3.8		4.0	3.5	3.5
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	10.8		7.1	6.0	6.2	15.8		8.0	6.4	7.6
343	3.43	5.7		6.5	5.4	5.5	5.7		5.5	6.0	5.4
505	2.70	4.1		4.4	4.7	4.7	3.4		4.3	5.0	4.6
935	7.17	3.0		3.4	3.4	3.4	2.6		3.6	3.5	3.6
1372	7.28	3.2		3.5	4.2	4.1	2.3		3.5	3.6	3.5

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F -5. -Time distribution of emission rate during 1975 CVS test

(Vehicle No.42, 1973 350 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
_COLD_START_(COLD_TRANSIENT_AND_STABILIZED PHASE)_											
137	2.28	12.1		9.4	4.3	3.8	19.0		11.2	8.9	7.9
343	3.43	13.0		8.8	7.5	7.6	7.6		6.4	5.9	6.1
505	2.70	3.0		4.6	5.7	6.2	2.6		4.0	4.9	5.1
935	7.17	1.5		2.6	3.5	3.5	1.8		2.9	3.3	3.4
1372	7.28	1.2		2.4	3.3	3.2	1.4		2.8	3.1	3.1
_HOT START (HOT_TRANSIENT_PLUS STABILIZED_PHASE_OF COLD_START)_											
137	2.28	4.4		4.0	6.2	6.4	6.4		4.8	8.7	7.8
343	3.43	9.0		7.7	7.2	7.3	6.4		6.4	6.0	6.1
505	2.70	6.1		6.8	6.1	6.1	[illegible]		5.6	5.2	5.3
935	7.17	3.3		3.3	3.2	3.2	3.9		3.7	3.3	3.4
1372	7.28	2.6		3.1	3.0	2.9	3.0		3.5	3.0	3.1
_1975_CVS_COMPOSITE_(43% OF_COLD START PLUS_57%_OF HOT START)_											
137	2.28	9.2		6.7	5.5	5.3	14.2		7.9	8.8	7.8
343	3.43	11.4		8.2	7.3	7.5	7.1		6.4	6.0	6.1
505	2.70	4.2		5.7	6.0	6.1	3.5		4.9	5.0	5.2
935	7.17	2.2		2.9	3.3	3.3	2.6		3.3	3.3	3.4
1372	7.28	1.7		2.8	3.1	3.0	2.0		3.2	3.1	3.1

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-6. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.43, 1973 400 CID Ford w/Catalyst)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	19.9	19.4	23.9	20.1	15.3	25.0	17.4	13.1	15.1	20.7
343	3.43	15.5	15.4	7.3	10.0	11.7	9.2	12.1	7.3	6.5	4.8
505	2.70	.3	.7	5.2	3.9	4.7	2.0	2.5	4.8	4.9	2.6
935	7.17	.0	.1	.4	.6	.8	.4	.8	2.3	2.0	2.0
1372	7.28	.0	.1	.5	.7	.9	.4	.8	2.2	2.1	2.0
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	12.0	12.3	11.5	18.1	16.2	8.7	18.0	16.4	17.0	17.9
343	3.43	11.7	11.7	14.9	10.1	10.8	6.7	7.1	8.1	6.9	6.8
505	2.70	6.3	5.7	4.3	6.1	4.6	5.4	5.3	3.6	4.4	4.2
935	7.17	1.0	1.1	.7	.5	.9	2.9	1.4	1.8	1.7	1.7
1372	7.28	1.1	1.2	.8	.5	1.0	3.0	1.4	1.7	1.8	1.7
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	19.6	18.8	18.5	18.8	15.8	22.4	17.7	15.2	16.2	19.0
343	3.43	15.4	15.1	10.7	10.1	11.2	8.8	9.9	7.8	6.7	6.0
505	2.70	.5	1.1	4.8	5.3	4.6	2.5	3.7	4.0	4.6	3.6
935	7.17	.1	.2	.5	.5	.8	.8	1.1	2.0	1.9	1.8
1372	7.28	.1	.2	.6	.6	1.0	.8	1.1	1.9	1.9	1.8

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-7. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.44, 1973 128 CID Opel Diesel)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	8.6	6.4	5.8	5.7		17.8	13.8	7.8	8.6	
343	3.43	8.8	5.9	6.3	7.5		12.0	7.9	6.7	10.5	
505	2.70	5.3	5.4	5.1	6.2		2.0	4.7	4.7	5.6	
935	7.17	2.3	3.3	3.4	3.1		.9	2.0	3.1	2.0	
1372	7.28	2.6	3.7	3.7	3.1		.8	2.0	3.4	2.0	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	4.8	4.8	4.7	5.0		4.8	4.9	4.1	4.8	
343	3.43	6.0	5.8	5.7	7.5		9.0	6.1	5.5	13.8	
505	2.70	5.2	5.3	4.9	5.7		6.2	5.0	4.6	6.4	
935	7.17	3.6	3.6	3.7	3.3		3.1	3.7	3.9	1.7	
1372	7.28	4.0	4.0	4.1	3.3		2.7	3.8	4.3	1.7	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	6.8	5.5	5.2	5.3		14.1	10.1	5.9	6.3	
343	3.43	7.5	5.9	6.0	7.5		11.2	7.2	6.1	12.6	
505	2.70	5.2	5.3	5.0	5.9		3.3	4.8	4.7	6.1	
935	7.17	2.9	3.5	3.6	3.2		1.5	2.7	3.5	1.8	
1372	7.28	3.2	3.8	3.9	3.2		1.3	2.7	3.8	1.8	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-8. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.45, 1974 351-C CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
- COLD START (COLD TRANSIENT AND STABILIZED PHASE) -											
137	2.28	20.7		17.9	7.0		31.6		14.3	8.0	
343	3.43	13.4		9.6	7.4		5.7		5.7	5.3	
505	2.70	1.0		3.3	4.4		1.9		3.3	4.1	
935	7.17	.3		1.2	2.9		.2		2.5	3.3	
1372	7.28	.2		1.1	3.5		.2		2.9	3.9	
- HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START) -											
137	2.28	3.9		7.0	9.6		5.0		5.7	7.3	
343	3.43	8.7		9.6	7.4		5.6		5.8	5.6	
505	2.70	4.3		6.1	6.0		4.3		4.9	4.7	
935	7.17	3.9		2.5	2.3		4.0		3.5	3.3	
1372	7.28	3.0		2.3	2.7		4.0		4.0	3.8	
- 1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START) -											
137	2.28	19.1		13.6	8.7		29.8		10.1	7.6	
343	3.43	12.9		9.6	7.4		5.7		5.7	5.5	
505	2.70	1.4		4.4	5.4		2.0		4.1	4.5	
935	7.17	.7		1.7	2.5		.5		3.0	3.3	
1372	7.28	.5		1.6	3.0		.5		3.4	3.9	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-9. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.46, 1973 350 CID Chevrolet w/Catalyst)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	39.4	36.0	25.6	13.4	12.3	37.6	32.2	30.5	24.8	28.1
343	3.43	2.4	3.8	8.4	13.1	12.6	2.2	3.7	4.3	4.8	3.8
505	2.70	.6	1.6	4.3	6.7	8.5	.5	1.9	2.3	3.0	1.4
935	7.17	.0	.0	.1	.4	.4	.4	.6	.7	1.3	1.3
1372	7.28	.0	.0	.1	.5	.4	.3	.6	.6	1.3	1.3
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	10.2	12.5	11.8	12.4	9.6	10.7	10.5	12.0	13.0	13.1
343	3.43	12.5	13.0	13.6	14.2	16.8	6.0	5.5	6.5	6.0	7.2
505	2.70	8.6	8.0	8.3	6.8	6.4	3.0	3.6	4.3	3.1	3.3
935	7.17	.7	.3	.3	.3	.2	3.9	3.4	2.9	2.8	2.4
1372	7.28	.8	.4	.3	.3	.2	2.6	3.2	2.4	2.9	2.6
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	38.5	33.9	21.5	12.8	10.4	34.2	27.9	26.0	20.4	22.0
343	3.43	2.7	4.6	10.0	13.8	15.5	2.7	4.1	4.8	5.2	5.2
505	2.70	.8	2.1	5.5	6.7	7.0	.8	2.2	2.8	3.0	2.2
935	7.17	.0	.1	.1	.3	.3	.9	1.2	1.3	1.9	1.7
1372	7.28	.0	.1	.2	.4	.3	.6	1.1	1.0	1.9	1.9

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-10.- Time distribution of emission rate during 1975 CVS test

(Vehicle No.47, PROCO Capri w/Catalyst)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	37.1	30.8	28.1	28.0		30.4	25.6	30.6	28.5	
343	3.43	2.2	4.6	4.4	4.0		5.9	8.5	3.3	5.4	
505	2.70	2.0	3.0	4.6	3.4		2.2	1.2	.5	2.3	
935	7.17	.1	.4	.6	.8		.3	.6	1.5	.7	
1372	7.28	.2	.4	.5	1.0		.3	.6	.9	.7	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	6.6	6.2	3.6	4.7		7.6	8.6	5.2	9.9	
343	3.43	8.0	9.6	4.1	5.6		8.2	8.4	5.6	8.4	
505	2.70	7.8	5.0	4.3	5.8		7.9	4.5	4.3	7.3	
935	7.17	2.3	2.6	4.9	3.4		2.4	2.8	4.9	2.0	
1372	7.28	2.7	2.9	4.3	4.1		2.2	2.7	3.0	2.0	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	34.8	26.8	24.6	22.5		27.0	21.6	23.2	22.6	
343	3.43	2.7	5.4	4.4	4.4		6.3	8.5	4.0	6.4	
505	2.70	2.5	3.3	4.5	4.0		3.0	2.0	1.6	3.9	
935	7.17	.3	.7	1.2	1.4		.6	1.1	2.5	1.1	
1372	7.28	.4	.8	1.1	1.7		.6	1.1	1.6	1.1	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-11. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.48, 1973 318 CID Plymouth w/Catalyst)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
		COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	38.5	42.8	42.4	37.1	22.9	36.2	36.8	36.0	34.1	27.2
343	3.43	3.2	.4	.1	.5	.9	2.6	1.8	2.1	2.8	2.9
505	2.70	.1	.0	.1	.5	1.0	.5	.4		.1	.1
935	7.17	.0	.0	.2	.6	2.3	.6	.7	.7	.9	1.5
1372	7.28	.0	.1	.2	1.1	3.5	.4	.5	.7	.8	2.3
		HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	6.6	7.0	8.4	24.1	18.2	5.9	7.1	9.2	18.7	20.7
343	3.43	6.4	6.6	6.2	4.0	3.9	6.6	5.9	7.7	4.7	2.9
505	2.70	5.4	5.6	6.0	4.9	6.4	3.6	4.4	3.7	2.7	2.0
935	7.17	3.1	2.8	2.9	.9	1.5	4.2	4.2	3.0	2.6	2.0
1372	7.28	3.7	3.6	3.1	1.5	2.3	3.3	3.0	3.0	2.1	3.1
		1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	38.1	42.0	39.7	30.9	19.8	31.7	31.4	29.5	29.1	24.0
343	3.43	3.3	.5	.6	2.2	2.9	3.2	2.6	3.5	3.4	2.9
505	2.70	.2	.2	.5	2.6	4.6	1.0	1.1	.9	.9	1.0
935	7.17	.1	.1	.4	.8	1.8	1.1	1.3	1.3	1.5	1.8
1372	7.28	.1	.1	.4	1.3	2.7	.9	.9	1.3	1.2	2.7

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-12. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.49, 1967 289 CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	14.2	12.3	9.2	2.9		10.2	15.2	8.5	5.6	
343	3.43	10.5	8.5	7.2	5.4		9.3	7.0	7.1	6.4	
505	2.70	2.8	2.7	3.7	4.7		1.9	2.2	3.8	4.3	
935	7.17	1.7	2.5	3.1	4.3		1.4	2.6	3.2	3.6	
1372	7.28	1.6	2.4	3.0	4.3		1.3	2.3	3.2	3.5	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	6.1	3.2	4.1	4.8		6.0	3.6	4.7	5.1	
343	3.43	5.6	2.9	3.8	4.9		7.3	4.5	5.7	5.7	
505	2.70	6.4	3.5	4.4	4.9		6.6	3.7	4.9	4.9	
935	7.17	3.5	5.1	4.7	4.1		3.1	4.8	3.9	3.9	
1372	7.28	3.4	5.0	4.4	4.0		3.0	4.4	3.9	3.8	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	11.0	8.8	6.8	4.0		14.3	10.4	6.5	5.7	
343	3.43	8.6	6.3	5.6	5.1		8.6	6.0	6.4	6.0	
505	2.70	4.2	3.0	4.0	4.9		3.6	2.9	4.4	4.6	
935	7.17	2.4	3.5	3.9	4.2		2.0	3.5	3.6	3.8	
1372	7.28	2.3	3.4	3.6	4.1		1.9	3.2	3.5	3.7	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-13. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.50, 1971 351-W CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	17.7	17.7	25.8	9.2		20.2	17.3	12.9	7.8	
343	3.43	12.2	11.6	6.0	6.4		9.2	8.9	6.8	6.8	
505	2.70	1.8	1.8	3.1	4.4		2.4	2.5	3.7	4.4	
935	7.17	1.0	1.1	.9	3.1		1.2	1.7	2.7	3.5	
1372	7.28	.8	1.0	.8	3.2		1.0	1.5	2.4	3.1	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	3.9	3.6	7.8	10.8		4.6	5.3	5.4	7.0	
343	3.43	4.0	4.0	7.4	6.5		5.8	5.9	6.4	6.5	
505	2.70	4.4	3.7	6.2	5.7		4.9	4.8	5.1	5.6	
935	7.17	5.0	4.9	3.0	2.6		4.2	4.1	3.8	3.4	
1372	7.28	4.1	4.5	2.5	2.6		3.6	3.5	3.4	3.0	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	14.8	14.6	20.6	10.2		16.0	13.1	9.2	7.3	
343	3.43	10.5	9.9	6.4	6.5		8.3	7.8	6.6	6.6	
505	2.70	2.3	2.2	4.0	5.2		3.1	3.3	4.4	5.1	
935	7.17	1.8	1.9	1.5	2.7		2.0	2.6	3.2	3.4	
1372	7.28	1.5	1.8	1.3	2.8		1.7	2.2	2.9	3.1	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-14. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.51, 1971 350 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	21.5	26.2	19.9	7.0	6.6	22.4	22.6	10.0	6.6	11.6
343	3.43	11.0	7.5	8.3	6.3	7.0	6.9	5.3	7.2	6.1	5.3
505	2.70	1.6	1.6	2.4	4.2	3.8	2.0	2.3	4.1	4.0	3.4
935	7.17	.7	.7	1.5	3.7	3.3	1.4	1.7	3.0	3.8	3.2
1372	7.28	.6	.6	1.2	3.4	3.7	1.3	1.6	2.7	3.5	3.1
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	4.4	4.6	4.9	6.4	6.4	6.6	6.3	4.9	5.7	6.0
343	3.43	7.0	6.3	7.2	6.0	7.0	5.7	5.9	5.9	5.9	6.3
505	2.70	5.0	4.6	4.6	5.2	6.0	4.8	4.7	4.9	5.2	5.5
935	7.17	3.9	4.1	4.1	3.7	3.0	3.7	3.7	4.0	3.8	3.5
1372	7.28	3.3	3.6	3.1	3.4	3.3	3.5	3.6	3.6	3.5	3.4
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	18.4	22.1	14.9	6.7	6.5	17.2	16.5	7.5	6.1	8.5
343	3.43	10.3	7.3	8.0	6.1	7.0	6.5	5.6	6.6	6.0	5.9
505	2.70	2.2	2.2	3.1	4.8	5.1	2.9	3.2	4.6	4.7	4.5
935	7.17	1.3	1.4	2.4	3.7	3.1	2.2	2.5	3.5	3.8	3.4
1372	7.28	1.1	1.2	1.8	3.4	3.5	2.1	2.3	3.1	3.5	3.3

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-15. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.52, 1971 400 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
				COLD START (COLD TRANSIENT AND STABILIZED PHASE)							
137	2.28	17.2	21.2	11.3	4.4	4.8	22.2	18.7	8.0	5.3	8.2
343	3.43	12.3	8.6	5.7	4.3	5.2	7.3	6.3	5.7	5.2	5.2
505	2.70	1.4	1.6	4.1	4.6	4.8	1.8	2.7	4.0	4.5	4.1
935	7.17	1.0	1.2	3.2	4.0	4.0	1.4	2.0	3.6	3.9	3.6
1372	7.28	1.0	1.2	2.9	4.6	4.1	1.3	1.9	3.5	4.1	3.6
				HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)							
137	2.28	3.2	2.9	3.8	5.9	6.5	4.7	3.5	4.3	5.6	5.4
343	3.43	3.7	4.0	4.3	4.5	5.6	4.6	3.8	5.0	5.1	5.5
505	2.70	4.3	4.7	4.6	5.2	5.2	4.6	5.3	5.0	5.1	5.1
935	7.17	4.7	4.5	4.7	3.7	3.5	4.3	4.4	4.2	3.8	3.8
1372	7.28	4.7	4.7	4.2	4.2	3.6	4.2	4.2	4.1	3.9	3.8
				1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)							
137	2.28	14.1	16.5	7.8	5.3	5.8	16.9	13.0	6.0	5.5	6.7
343	3.43	10.4	7.4	5.0	4.5	5.5	6.5	5.4	5.3	5.1	5.4
505	2.70	2.1	2.4	4.3	5.0	5.0	2.6	4.1	4.5	4.9	4.7
935	7.17	1.8	2.1	3.9	3.8	3.7	2.2	2.9	3.9	3.9	3.7
1372	7.28	1.8	2.1	3.5	4.4	3.8	2.2	2.8	3.8	4.0	3.7

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-16. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.53, 1967 283 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
		COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	13.5	10.8	5.9	3.8		15.2	12.0	7.1	5.0	
343	3.43	5.9	5.8	6.4	6.9		6.4	6.8	7.4	7.4	
505	2.70	3.2	3.7	4.4	4.6		3.4	3.6	4.6	4.6	
935	7.17	2.8	3.3	3.9	4.1		2.4	2.8	3.3	3.7	
1372	7.28	2.7	3.0	3.4	3.5		2.3	2.7	3.0	3.4	
		HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	3.7	3.4	3.2	4.0		4.0	4.1	4.2	4.7	
343	3.43	6.0	6.5	6.7	6.7		6.4	6.8	6.9	6.8	
505	2.70	4.7	4.8	4.6	5.0		4.6	5.1	5.1	5.3	
935	7.17	4.1	4.1	4.3	4.1		4.0	3.8	3.8	3.7	
1372	7.28	4.0	3.8	3.6	3.4		3.8	3.6	3.5	3.4	
		1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	8.8	7.0	4.4	3.9		10.2	8.1	5.5	4.8	
343	3.43	5.9	6.1	6.6	6.8		6.4	6.8	7.1	7.1	
505	2.70	4.0	4.3	4.6	4.9		3.9	4.3	4.9	5.0	
935	7.17	3.4	3.7	4.1	4.1		3.1	3.3	3.6	3.7	
1372	7.28	3.3	3.4	3.5	3.5		3.0	3.1	3.3	3.4	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-17. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.54, 1969 302 CID Ford)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
- COLD START (COLD TRANSIENT AND STABILIZED PHASE) -											
137	2.28	14.8	15.9	8.1	4.9		13.6	9.5	6.7	5.3	
343	3.43	12.6	11.8	8.8	7.2		8.5	7.2	6.1	5.0	
505	2.70	2.1	2.4	4.4	5.4		3.4	4.0	4.4	4.6	
935	7.17	.8	1.0	2.9	2.9		2.1	3.1	3.8	3.9	
1372	7.28	1.6	1.3	2.5	3.9		2.1	2.9	3.4	4.1	
- HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START) -											
137	2.28	3.1	3.3	3.8	7.2		4.1	5.3	5.0	4.7	
343	3.43	4.9	7.6	6.0	6.9		5.0	5.5	5.0	5.0	
505	2.70	3.9	5.1	4.7	6.4		5.0	5.2	5.1	4.8	
935	7.17	3.1	3.2	4.3	2.5		4.1	3.9	4.2	4.0	
1372	7.28	6.0	4.1	3.7	3.3		4.2	3.7	3.8	4.2	
- 1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START) -											
137	2.28	11.8	12.2	6.0	6.3		9.8	7.4	5.8	5.0	
343	3.43	10.6	10.5	7.5	7.0		7.1	6.3	5.5	5.0	
505	2.70	2.6	3.2	4.6	6.0		4.0	4.6	4.8	4.7	
935	7.17	1.4	1.7	3.6	2.7		2.9	3.5	4.0	3.9	
1372	7.23	2.7	2.1	3.1	3.6		3.0	3.3	3.6	4.2	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-18. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.55, 1970 383 CID Chrysler)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, °F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	14.4	14.1	10.1	8.5	9.7	15.2	11.7	7.7	7.4	9.0
343	3.43	10.1	9.2	8.5	6.3	5.5	7.4	6.8	6.8	6.4	5.9
505	2.70	4.6	4.1	4.7	4.6	4.2	3.5	4.0	4.7	4.7	4.3
935	7.17	1.5	1.9	2.6	3.1	3.2	2.3	2.9	3.3	3.4	3.4
1372	7.28	1.2	1.6	2.3	3.4	3.4	2.0	2.5	3.1	3.4	3.2
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	3.3	4.0	4.9	5.4	5.3	4.9	4.7	4.9	5.6	5.3
343	3.43	7.2	6.5	7.2	7.1	6.4	5.9	5.9	6.1	6.6	6.3
505	2.70	5.1	5.0	5.3	5.7	5.6	5.1	5.0	5.2	5.5	5.4
935	7.17	4.4	4.2	3.7	3.2	3.5	4.0	4.1	3.9	3.5	3.7
1372	7.28	3.4	3.5	3.3	3.4	3.6	3.6	3.6	3.5	3.4	3.5
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	10.7	10.3	7.6	6.7	7.2	10.8	8.3	6.3	6.4	7.0
343	3.43	9.1	8.2	7.8	6.8	6.0	6.8	6.3	6.4	6.5	6.1
505	2.70	4.8	4.4	5.0	5.2	5.0	4.2	4.5	5.0	5.1	4.9
935	7.17	2.4	2.7	3.1	3.2	3.4	3.0	3.5	3.6	3.4	3.5
1372	7.28	1.9	2.3	2.7	3.4	3.5	2.6	3.0	3.3	3.4	3.4

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-19. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.56, 1974 140 CID Ford w/Catalyst)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	[illegible]	75	110	110 w/air
_ COLD_START_(COLD_TRANSIENT_AND_STABILIZED PHASE)_											
137	2.28	22.7	23.3	10.7	5.4	3.3	35.7	33.2	18.6	20.5	22.9
343	3.43	11.7	11.7	16.1	13.9	10.3	4.8	5.3	12.0	9.8	9.6
505	2.70	1.9	.3	2.5	4.9	5.2			1.4	.4	.7
935	7.17	.2	.4	.8	1.4	2.4	.2	.5	1.0	1.2	.8
1372	7.28	.2	.5	1.1	2.3	3.5	.1	.3	.7	1.4	1.0
_ HOT START (HOT_TRANSIENT_PLUS STABILIZED_PHASE_OF COLD_START) _											
137	2.28	3.6	3.5	4.6	3.7	2.3	10.0	17.2	15.8	23.0	18.6
343	3.43	18.8	14.4	15.7	13.6	11.1	12.7	8.9	9.9	8.8	11.2
505	2.70	2.3	2.7	3.5	7.5	6.5	2.5	1.5	1.9	2.3	3.2
935	7.17	1.4	2.1	1.5	1.3	2.2	2.1	2.1	2.0	.7	.6
1372	7.28	1.5	2.7	2.1	2.1	3.2	1.7	1.5	1.5	.8	.8
_ 1975_CVS_COMPOSITE_(43% OF_COLD START PLUS_57%_OF HOT START)_											
137	2.28	19.9	19.5	8.3	4.4	2.7	33.4	29.4	17.5	22.2	20.2
343	3.43	12.8	12.1	15.9	13.7	10.7	5.5	6.1	11.1	9.1	10.6
505	2.70	2.0	.7	2.9	6.4	6.0	.3	.4	1.6	1.7	2.3
935	7.17	.4	.7	1.1	1.4	2.3	.3	.9	1.4	.9	.7
1372	7.28	.4	.9	1.5	2.1	3.4	.3	.6	1.0	1.0	.9

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-20. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.57, 1969 307 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	18.7	16.5	15.3	5.8	4.8	19.6	17.3	10.6	5.9	5.7
343	3.43	6.9	6.9	7.3	7.0	6.9	6.3	6.7	7.1	6.5	6.4
505	2.70	2.2	3.2	3.0	4.8	4.8	2.1	3.0	4.0	4.6	4.7
935	7.17	2.0	2.1	2.3	3.7	3.8	2.1	2.1	3.0	3.8	3.8
1372	7.28	1.8	2.0	2.1	3.2	3.4	1.8	2.0	2.7	3.4	3.4
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	3.5	3.6	3.9	5.3	5.4	4.2	4.5	4.9	5.6	4.8
343	3.43	5.5	7.4	6.8	7.3	7.5	5.8	6.7	6.3	7.4	6.6
505	2.70	5.5	4.1	4.9	5.2	5.7	4.8	4.6	5.1	5.2	5.3
935	7.17	4.3	3.9	3.9	3.7	3.4	4.2	3.9	3.9	3.5	3.8
1372	7.28	3.8	3.7	3.6	3.1	3.0	3.7	3.6	3.5	3.1	3.4
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	12.8	11.1	10.3	5.5	5.2	13.6	12.0	7.7	5.7	5.2
343	3.43	6.3	7.1	7.1	7.2	7.3	6.1	6.7	6.7	7.0	6.5
505	2.70	3.5	3.6	3.8	5.0	5.3	3.2	3.7	4.6	5.0	5.0
935	7.17	2.9	2.9	3.0	3.7	3.6	2.9	2.8	3.4	3.6	3.8
1372	7.28	2.6	2.7	2.8	3.1	3.2	2.5	2.6	3.1	3.2	3.4

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-21. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.58, 1969 290 CID AMC)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	21.1	18.1	15.2	6.0		21.3	15.9	9.0	7.0	
343	3.43	9.7	9.3	9.6	6.6		7.6	8.0	7.7	6.3	
505	2.70	1.6	1.7	3.1	3.7		2.2	3.1	4.3	4.8	
935	7.17	1.0	1.5	1.7	3.7		1.4	2.0	3.0	3.6	
1372	7.28	1.0	1.5	1.6	3.8		1.3	1.8	2.7	3.3	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	4.3	4.3	5.7	7.1		4.2	4.1	4.4	5.2	
343	3.43	6.9	7.3	7.8	7.5		6.3	6.5	6.7	6.6	
505	2.70	4.0	5.0	5.0	5.5		5.0	5.5	5.4	5.2	
935	7.17	3.8	3.5	3.4	2.9		3.9	3.9	3.8	3.7	
1372	7.28	3.9	3.6	3.1	3.0		3.7	3.5	3.4	3.4	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	16.8	13.1	11.3	6.7		15.9	11.1	6.7	6.0	
343	3.43	9.0	8.5	8.9	7.2		7.2	7.4	7.2	6.5	
505	2.70	2.2	2.9	3.9	4.8		3.1	4.1	4.9	5.0	
935	7.17	1.7	2.2	2.4	3.2		2.2	2.8	3.4	3.6	
1372	7.28	1.7	2.3	2.2	3.3		2.1	2.5	3.1	3.4	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test sequence.

TABLE F-22. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.59, 1967 318 CID Plymouth)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	12.6	11.6	9.7	8.0		18.3	19.7	15.0	9.9	
343	3.43	12.1	10.7	10.0	6.7		9.7	9.1	8.7	6.4	
505	2.70	2.3	2.3	3.1	4.6		2.3	1.8	2.6	3.9	
935	7.17	1.5	2.1	2.6	3.5		1.3	1.4	2.1	3.3	
1372	7.28	1.7	2.1	2.3	3.0		1.3	1.3	1.9	2.9	
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	4.7	4.3	4.2	4.6		4.5	4.2	4.1	4.4	
343	3.43	5.4	6.0	5.7	5.8		5.4	5.6	5.5	5.6	
505	2.70	5.5	5.5	5.4	5.8		4.7	5.0	4.9	5.2	
935	7.17	3.7	3.8	4.1	4.0		4.2	4.1	4.2	4.1	
1372	7.28	4.1	3.7	3.7	3.4		3.9	3.9	3.9	3.7	
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	9.8	8.5	7.2	6.2		14.2	15.0	10.6	7.1	
343	3.43	9.6	8.7	8.1	6.2		8.4	8.0	7.5	6.0	
505	2.70	3.5	3.7	4.1	5.2		3.0	2.7	3.5	4.6	
935	7.17	2.3	2.9	3.3	3.8		2.2	2.2	2.9	3.7	
1372	7.28	2.5	2.8	2.9	3.2		2.1	2.1	2.7	3.3	

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-23. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.60, 1970 350 CID Oldsmobile)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
		COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	15.0	14.2	11.3	6.4	6.4	14.8	11.4	10.2	8.0	8.5
343	3.43	7.0	7.8	8.4	5.9	5.9	6.1	6.7	6.9	6.1	5.7
505	2.70	3.6	3.3	4.0	4.4	4.7	3.6	3.9	4.1	4.4	4.2
935	7.17	2.3	2.3	2.6	3.8	3.8	2.6	2.9	3.1	3.5	3.6
1372	7.28	2.1	2.1	2.2	3.5	3.4	2.4	2.7	2.7	3.2	3.3
		HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	3.5	4.2	4.5	6.0	6.4	3.9	4.3	4.6	6.6	6.4
343	3.43	5.4	5.4	6.1	6.2	6.9	6.1	6.1	6.4	6.9	6.9
505	2.70	5.1	4.7	5.0	5.3	6.2	5.3	5.0	5.1	5.7	5.6
935	7.17	4.3	4.3	4.2	3.6	3.3	4.0	4.0	3.9	3.3	3.4
1372	7.28	3.9	4.0	3.5	3.4	3.0	3.7	3.7	3.5	3.0	3.1
		1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	10.2	10.0	8.2	6.2	6.4	9.9	7.9	7.4	7.2	7.3
343	3.43	6.3	6.8	7.4	6.1	6.5	6.1	6.4	6.6	6.6	6.4
505	2.70	4.2	3.9	4.4	4.9	5.6	4.3	4.4	4.6	5.2	5.0
935	7.17	3.1	3.1	3.3	3.7	3.5	3.2	3.5	3.5	3.4	3.5
1372	7.28	2.9	2.9	2.8	3.4	3.1	3.0	3.2	3.1	3.1	3.2

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-24. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.51, 1971 455 CID Buick)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, °F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
COLD START (COLD TRANSIENT AND STABILIZED PHASE)											
137	2.28	23.8	21.3	20.8	13.9	12.6	19.6	13.1	10.1	12.1	10.3
343	3.43	7.3	7.3	4.3	1.8	3.1	4.5	5.0	3.3	3.6	3.4
505	2.70	1.5	1.3	2.1	2.6	3.6	2.0	2.6	3.5	2.7	2.6
935	7.17	1.0	1.5	2.1	4.0	3.3	2.2	2.1	3.6	3.5	3.9
1372	7.28	1.3	1.7	2.3	3.7	3.7	2.6	2.7	4.2	3.8	4.1
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)											
137	2.28	6.4	5.4	6.2	7.7	7.4	7.0	6.4	5.8	6.6	5.6
343	3.43	5.0	4.1	4.7	6.1	6.2	4.7	5.1	5.3	6.7	5.7
505	2.70	4.3	4.4	4.5	4.8	5.5	4.5	3.7	4.7	6.2	5.0
935	7.17	3.4	4.0	3.9	3.5	3.1	3.5	3.5	3.6	3.0	3.6
1372	7.28	4.4	4.6	4.1	3.2	3.4	4.2	4.4	4.2	3.3	3.8
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)											
137	2.28	19.0	16.1	14.7	10.2	9.5	13.9	12.9	7.6	8.8	7.6
343	3.43	6.7	6.3	4.5	4.4	4.9	4.6	5.0	4.4	5.5	4.7
505	2.70	2.3	2.4	3.1	3.9	4.7	3.1	3.1	4.1	4.8	4.0
935	7.17	1.7	2.3	2.9	3.7	3.2	2.8	2.8	3.6	3.2	3.7
1372	7.23	2.1	2.6	3.0	3.4	3.6	3.3	3.4	4.2	3.5	4.0

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

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TABLE F-25. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.62, 1969 390 CID Mercury)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
_ COLD_START_(COLD_TRANSIENT_AND_STABILIZED PHASE)_											
137	2.28	23.4	24.6	22.9	7.3	5.7	25.1	18.4	13.2	8.6	5.7
343	3.43	11.7	9.0	7.9	5.1	3.9	7.7	6.7	7.1	6.0	5.8
505	2.70	.9	1.1	1.7	3.1	2.4	1.6	3.0	3.7	4.3	4.4
935	7.17	.3	.6	1.0	3.4	4.2	.9	2.0	2.6	3.4	3.8
1372	7.28	.2	.7	1.1	4.5	5.1	.8	1.8	2.3	3.3	3.8
_ HOT START (HOT_TRANSIENT_PLUS STABILIZED_PHASE_OF COLD_START) _											
137	2.28	4.6	5.4	5.5	9.2	8.4	4.0	4.5	4.3	4.9	5.2
343	3.43	4.3	3.9	3.7	4.4	5.0	5.4	5.9	5.9	6.2	6.0
505	2.70	5.4	3.7	3.9	5.1	5.0	4.8	5.2	5.4	5.2	5.4
935	7.17	4.8	4.1	4.3	3.0	3.2	4.3	4.0	4.0	3.8	3.7
1372	7.28	3.5	4.8	4.6	3.9	3.8	4.0	3.7	3.7	3.6	3.6
_ 1975_CVS_COMPOSITE_(43% OF_COLD START PLUS_57%_OF HOT START)_											
137	2.28	22.0	21.3	18.6	8.5	7.4	20.5	13.0	9.2	6.6	5.4
343	3.43	11.2	8.1	6.9	4.7	4.6	7.2	6.3	6.6	6.1	5.9
505	2.70	1.3	1.5	2.3	4.3	4.0	2.3	3.9	4.5	4.8	5.0
935	7.17	.7	1.2	1.8	3.2	3.5	1.6	2.8	3.2	3.6	3.7
1372	7.28	.5	1.4	2.0	4.2	4.2	1.5	2.5	2.9	3.4	3.7

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-26. - Time distribution of emission rate during 1975 CVS test

(Vehicle No.63, 1971 318 CID Dodge)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/					HC, relative emission rate, pct per minute				
		Ambient test temperature, F									
		20	50	75	110	110 w/air	20	50	75	110	110 w/air
		- COLD START (COLD TRANSIENT AND STABILIZED PHASE) -									
137	2.28	24.4	21.4	6.4	9.4	6.4	18.6	15.0	5.9	7.4	5.9
343	3.43	5.6	7.0	5.8	6.3	5.8	5.6	6.0	5.8	6.3	5.8
505	2.70	2.6	3.7	7.7	4.8	7.7	3.0	3.5	5.3	4.3	5.3
935	7.17	1.2	1.2	3.3	3.2	3.3	2.2	2.6	3.8	3.6	3.8
1372	7.28	1.2	1.2	3.0	2.9	3.0	1.9	2.3	3.4	3.3	3.4
		- HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START) -									
137	2.28	2.5	3.5	4.9	3.6	4.9	4.3	4.5	4.6	4.3	4.6
343	3.43	8.0	9.2	7.6	6.6	7.6	6.2	6.5		6.6	6.1
505	2.70	5.5	5.8	7.7	8.3	7.7	5.0	5.0	7.7	5.3	5.7
935	7.17	3.7	3.2	3.0	3.4	3.0	4.1	4.0	2.1	3.9	3.9
1372	7.28	3.6	3.0	2.8	3.1	2.8	3.6	3.5	3.8	3.5	3.5
		- 1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START) -									
137	2.28	17.6	15.4	5.6	6.2	5.6	12.6	10.0	11.2	5.7	5.1
343	3.43	6.3	7.7	6.8	6.5	6.8	5.8	6.2	3.4	6.5	5.9
505	2.70	3.5	4.4	7.7	6.8	7.7	3.9	4.2	7.6	4.9	5.5
935	7.17	2.0	1.9	3.1	3.3	3.1	3.0	3.3	2.1	3.8	3.9
1372	7.28	1.9	1.8	2.8	3.0	2.8	2.6	2.9	3.8	3.4	3.5

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-27. - Time distribution of emission rate during 1975 CVS test

(Vehicle No. 69, 1974 360 CID Plymouth)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/				HC, relative emission rate, pct per minute			
		Ambient test temperature, F							
		60	70	80	90	60	70	80	90
COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	32.5	21.3	17.2	13.7	22.2	17.4	15.4	12.2
343	3.43	3.3	5.9	6.0	5.8	5.4	5.9	6.0	6.2
505	2.70	1.5	2.8	3.6	4.4	2.1	3.0	3.8	4.1
935	7.17	.7	1.6	2.2	2.5	1.8	2.2	2.5	2.7
1372	7.28	.7	1.6	2.0	2.6	1.7	2.2	2.2	2.8
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	5.1	6.6	7.1	8.6	6.8	9.0	8.1	7.9
343	3.43	7.2	7.2	8.2	7.3	6.5	6.3	6.7	6.5
505	2.70	5.4	5.3	5.3	5.0	5.4	5.3	5.4	5.4
935	7.17	3.4	3.2	3.0	2.9	3.3	3.0	3.2	3.1
1372	7.28	3.4	3.2	2.7	2.9	3.2	3.0	2.8	3.1
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	26.4	15.3	12.2	10.9	15.9	13.3	11.7	9.9
343	3.43	4.2	6.4	7.1	6.6	5.8	6.1	6.3	6.4
505	2.70	2.3	3.9	4.4	4.7	3.5	4.1	4.6	4.8
935	7.17	1.3	2.3	2.6	2.7	2.4	2.6	2.9	2.9
1372	7.28	1.3	2.3	2.3	2.8	2.3	2.6	2.5	3.0

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-28. - Time distribution of emission rate during 1975 CVS test

(Vehicle No. 70, 1974 350 CID Chevrolet)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/				HC, relative emission rate, pct per minute			
		Ambient test temperature, F							
		60	70	80	90	60	70	80	90
COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	10.9	8.3	7.4	6.7	14.4	13.0	11.0	13.4
343	3.43	9.8	10.3	9.8	9.5	7.0	7.5	6.9	6.0
505	2.70	4.4	4.7	4.7	4.6	2.3	1.9	3.5	2.3
935	7.17	2.0	2.1	2.4	2.6	2.5	2.7	2.8	2.9
1372	7.28	2.1	2.4	2.7	2.8	2.6	2.8	3.0	3.0
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	3.4	3.9	4.6	5.6	6.3	7.1	7.9	8.3
343	3.43	7.7	6.7	7.9	7.3	5.9	5.8	6.2	6.2
505	2.70	6.7	7.8	6.5	6.6	4.7	4.6	5.3	4.8
935	7.17	3.2	3.0	2.9	3.0	3.6	3.5	3.1	3.2
1372	7.28	3.4	3.5	3.3	3.2	3.7	3.7	3.3	3.3
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	7.5	6.2	6.0	6.1	10.5	10.0	9.3	10.6
343	3.43	8.9	8.5	8.8	8.3	6.5	6.6	6.6	6.1
505	2.70	5.4	6.2	5.7	5.7	3.5	3.3	4.5	3.7
935	7.17	2.5	2.6	2.6	2.8	3.0	3.1	2.9	3.0
1372	7.28	2.7	2.9	3.0	3.0	3.2	3.3	3.2	3.2

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.

TABLE F-29. - Time distribution of emission rate during 1975 CVS test

(Vehicle No. 71, 1974 351 Ford Torino)

Elapsed test time, seconds	Time interval, minutes	CO, relative emission rate, pct per minute 1/				HC, relative emission rate, pct per minute			
		Ambient test temperature, F							
		60	70	80	90	60	70	80	90
COLD START (COLD TRANSIENT AND STABILIZED PHASE)									
137	2.28	22.4	16.6	14.3	10.4	15.9	13.3	13.8	9.9
343	3.43	7.5	9.2	8.5	9.4	7.7	7.5	7.2	7.5
505	2.70	2.2	2.6	3.5	4.0	2.9	2.8	3.1	3.7
935	7.17	1.3	1.8	2.1	2.3	2.1	2.7	2.5	2.9
1372	7.28	1.1	1.4	1.9	2.3	2.0	2.4	2.4	2.9
HOT START (HOT TRANSIENT PLUS STABILIZED PHASE OF COLD START)									
137	2.28	5.7	7.7	8.8	10.9	8.5	9.0	9.2	9.1
343	3.43	8.2	8.3	7.6	8.0	8.0	8.1	8.0	8.1
505	2.70	4.6	3.9	4.2	4.3	5.4	5.0	5.3	5.9
935	7.17	3.5	3.3	3.1	2.5	2.8	2.8	2.7	2.4
1372	7.28	2.9	2.7	2.7	2.5	2.6	2.5	2.5	2.5
1975 CVS COMPOSITE (43% OF COLD START PLUS 57% OF HOT START)									
137	2.28	16.9	12.9	11.6	10.6	12.1	10.9	11.2	9.4
343	3.43	7.7	8.8	8.1	8.7	7.9	7.9	7.6	7.9
505	2.70	3.0	3.2	3.9	4.2	4.2	4.0	4.3	5.0
935	7.17	2.0	2.4	2.6	2.4	2.4	2.7	2.6	2.6
1372	7.28	1.7	1.9	2.3	2.4	2.3	2.4	2.5	2.7

1/ Defined as equal to 100 times the mass emission rate in the time interval divided by the total mass emitted in the entire test segment.